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HANDBOOK ON DIET

BY

EUGENE E. MARCOVICI, M.D.

Formerly Assistant to Professor von Noorden in Vienna; Instructor, Post-Graduate Hospital; Assistant Attending Physician, Roosevelt Hospital, Out-Patient Department, New York.

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PREFACE

Diet is playing an increasingly important rôle in the treatment of most diseases; in many it may be considered the most essential part of the treatment.

Until recently in hospitals, sanatoriums and like institutions, the art of cooking has been relegated to those who were ignorant of dietetic values. The present trend, however, is to recognize the importance of correct food preparation, and the majority of hospitals have installed diet kitchens in charge of expert dietitians. Training in this branch of medicine is now considered essential by all good training schools for nurses.

Books heretofore published have been written either in highly scientific terminology or so simply as to be comprehensible to any layman. The former have had a very limited field; the latter have often sacrificed accuracy for simplicity. The purpose of this work is to fill the gap between these two types of books. This book, it is hoped, will prove to be simple enough in its terminology and yet of sufficient scientific accuracy to warrant the physician in recommending its perusal to his patient, especially the section or sections pertaining to the patient's particular malady.

No attempt at bibliography has been made. In general, however, I wish to acknowledge my indebtedness to the books on dietetics, first, by Professor Carl von Noorden and Hugo Salomon,[1] and second, by Docent Wilhelm Schlesinger,[2] of Vienna.

EUGENE E. MARCOVICI.

[1] Dietetics in General (von Noorden-Salomon), Berlin, 1920.

[2] Lectures on Diet and Cooking (W. Schlesinger), Vienna, 1917.

CONTENTS

CHAPTER V.

CHAPTER VI.

CHAPTER XI.

CHAPTER I.

THE DIETETIC TASK IN THE KITCHEN.

It is our purpose to discuss dietetics and the art of cooking. Formerly the preparation of foods was considered menial labor and left to the poorly educated; thus cooking lacked scientific background. The importance of correct feeding in the treatment of acute and chronic diseases is now fully recognized, and the physician's advice concerning the patient's diet forms an important part in the treatment of diseases. In fact, in many cases dietetic treatment is the only rational one.

We eat very few foods in their natural state. It is only by cooking that many foods are rendered palatable. In some instances, the manner of preparing foods is the same for the healthy as for the sick. In other instances, a different and more suitable mode of preparation is found necessary for the sick. Very frequently the physician is asked how some dish should be prepared. If he limits himself to explaining that it is to be prepared without seasoning or fat, his dietary instructions may not be heeded, as the patient may find such food unpalatable.

Our first concern is the quantitative factor. Every person has a certain food requirement which may be expressed numerically, either as a whole or in terms of the individual food elements of which the diet is made up, as proteins, fats, carbohydrates, and salts. Under pathological conditions the consumption of foodstuffs may be increased or decreased, and these quantitative changes may affect the whole metabolism or only that of the proteins.

The arrangement of menus for the various meals aids in regulating the quantity of food consumed. Further-

more, we must have a knowledge of the ingredients used and the changes they undergo during the process of cooking. Meats, eggs and cheese are examples of the proteins; flour and sugar of the carbohydrates, and lard and butter of the fats. The dishes should be prepared according to dietetic rules. Special quantitative indications may be met by the adding of specific foodstuffs in proper proportion. For instance, butter may be added where fat is needed; cheese and meat, where protein is needed, and eggs, where both protein and fat are needed. There are cases where we can satisfy the quantitative indications and at the same time preserve the traditions of cooking. For instance, there are certain ways of cooking vegetables so that they do not lose their flavor and carry a considerable amount of fat, which is necessary in the treatment of diabetes. In other cases, by the addition of eggs and cheese the diet is increased in its protein value.

Another important consideration in nutrition is a knowledge of the workings of the digestive organs. In fact, even apart from consideration of the purely gastrointestinal ailments there is probably no disease where stomach and intestines are not affected. The food for the sick should be of such a nature and so prepared that it is easily digested.

Foods are considered "less digestible" in proportion to the unpleasant sensations they produce in our digestive organs. A suitable diet was called by Rosenheim "beneficial" instead of digestible. Penzoldt considers "suitable" foods those which do not linger too long in the stomach. He compiled a table showing the degrees of digestibility of the various foods.

This relation between the digestibility of food and the period it remains in the stomach does not seem to hold in pathological conditions, as for instance in secretory disturbances of the stomach (any stage between lack and

continuous overflow of acids). In an anacid stomach indigestible foods do not remain as long as in a normal one, but they provoke diarrhea. Here the easily digestible foods must be administered. In disturbances of continuous overproduction of acid (hypersecretion) the stomach will react on slight stimulation with an excess of gastric juice; here, too, the task is to choose the proper foods and to prepare them in a way which least excites the secretory activities of the stomach.

What are the means employed to increase the digestibility of food? In the first place we must consider the proper selection of food, excluding tough meats and fibrous vegetables from the diet. The cleaning of the vegetables and the ageing and pounding of meats are important. Heat also plays an important rôle in regulating the quality of food. Heat changes fibrous tissues into a kind of jelly, and starch into dextrine (starch gum); it melts fat and breaks the rough skins of vegetables. These processes are essential forerunners of digestibility. Heat is used mainly in two forms; as boiling water and as dry heat. The heat of boiling water is relatively low—100° C.—but it penetrates the food uniformly and completely and thereby assures tenderness.

It is true that by boiling, substances (extractives) which are stimulating and of agreeable flavor are lost, but boiling is also responsible for the destruction of the injurious ones, as for instance in the case of the morel (species of mushroom) which is poisonous in the raw state but becomes edible through boiling.

One variety of boiling is stewing (cooking food in boiling water in a closed pan) in which steam is the heat dispenser. Because it is less intensive than the heat of boiling water, the chemical and physical changes are also less pronounced. This is very useful where valuable substances are to be preserved, such as the vegetable salts.

In frying and baking food, water is excluded and hot air brings about the refining of the dish and makes it tender. In frying, the fat is heated to boiling point, thus passing the heat to the food. Baking is a process by which starchy foods and other water-poor substances are subjected to high temperature, as distinguished from frying for which water-rich substances (meats, vegetables and fruits) are used. In frying and baking the heat is not uniform and does not penetrate as does boiling water, thus the food remains somewhat raw or rare and a crust is formed which prevents the escape of the juice. The temperature used varies according to whether frying or baking takes place in the oven or open pan. In most cases the temperature does not exceed 160° C. Very high temperatures are used in roasting, especially for meats which are covered with fat to prevent burning. The process between frying and stewing is pot-roasting. After roasting the meat for a short time in boiling fat, water or soup is added, after which it is cooked in a closed pan. Here the temperature of boiling water and steam is used and the crust again becomes soft. This method of heat application combines the advantage of preserving the flavor produced by frying and of tenderness obtained through boiling and stewing.

Fine division of food is essential. This is usually the task of a normal stomach, but in the case of the sick this must be done for them. For this purpose we use mechanical devices, as choppers and sieves, or add substances which are transformed to gaseous states by heat, and thus separate the particles, as for instance the mixing of beaten whites of eggs, followed by baking, or the addition of alcohol which evaporates through heating. Some stomachs cannot stand fatty dishes, as such foods leave the stomach slowly. Knowing that fat decreases the secretion of gastric juice, we use such foods in the treatment of hypersecretion.

However, the quality of fat used is important. Good fat, especially butter, is readily digested. When fat is melted, products of decomposition are formed which affect the stomach and intestines. This decomposition is more intensive the greater the heat. Therefore, the better way of preparing food is that in which fat is added at the end. Thus it seems clear that frying and baking, due to the high temperature and the added fat they require, are not as useful dietetically as boiling. The quality of the fat used depends upon its chemical composition and its melting point. Fats with melting points over the boiling temperature and the ones which have admixtures of fatty acids must be excluded.

Butter is the ideal fat because it contains water in a state of emulsion which prevents its decomposition when overheated. The temperature reached in heating flour and butter does not exceed 180° C., while in the use of other fats 220° C. is reached and exceeded. A characteristic odor accompanies the decomposition and is an indication of the fat. Thus in the preparation of food for the invalid butter alone should be used.

While the changes food undergoes in the stomach are well known and easily controlled, the possibility of observing the physiological digestion of food in the intestines is very small and our knowledge of the processes of digestion here is meager. Clinically, we distinguish between disturbances of motility in the intestines and the processes of fermentation and putrefaction. The prolonged arrest of food in the intestines tends to promote decomposition. Of especial interest from the dietetic standpoint is the close relationship between disturbances of gastric and intestinal functions. The diarrhea of gastric origin and spastic constipation have been studied more closely lately than other disturbances of intestinal motility. Food which, through lack of acid secretion, escapes fine division in the stomach

stimulates mechanically the small intestine and, consequently, peristalsis. The fibrous tissues of meat are most readily affected. In addition to the mechanical movement, bacteria are apt to lodge in the undigested meat and the resultant putrefactive substances provoke diarrhea. In this way are explained numerous cases of diarrhea which were heretofore diagnosed as due to intestinal disease. Anacidity (lack of acid) in the stomach leads to gastric diarrhea, but we have also observed many cases of acid gastric catarrh with severe diarrhea. The explanation of this anomaly is perhaps as follows: the mucus which covers the food, especially meat, prevents the action of the acid of the stomach and the effect is the same as in a stomach with no acid. Thus, the importance of increasing the digestibility of food in all cases of gastric diarrhea is clear. Again, there is an important relation between stomach function and motility of the intestines in spastic constipation, which accompanies the hypersecretion of the stomach. All the dietetic rules which apply in hypersecretion of the stomach will prove of benefit in the treatment of spastic constipation.

It is necessary to distinguish between the process of fermentation, which affects the carbohydrates, and the process of putrefaction, which affects the proteins. The abnormal decomposition of carbohydrates results in the production of acid and gaseous products, which play an important rôle in the diarrhea of infants and in the carbohydrate dyspepsia of the adult. Putrefaction in the intestines occurs not only in the occlusion of the intestines, typhoid fever, etc., but also in the so-called autointoxication. The causes of decomposition are different for carbohydrates and proteins, bacteria being chiefly responsible for putrefaction and yeast for fermentation. The fermentative agent is destroyed by cooking, and for this reason uncooked foods are rarely given to the sick. Furthermore, in arranging menus, fermentative agents and fermentable materials must

not be placed together; thus, cheese may be taken with meat or starchy carbohydrates, but if sugar is added fermentation will take place. By mixing the different foods thoroughly, we can also combat abnormal processes of fermentation; thus, by the addition of cereals we combat the condition of diarrhea caused by a milk diet.

Knowing the danger of the process of putrefaction, it is very important for us to oppose the process of fermentation to the process of putrefaction; thus, we abstain from carbohydrates in fermentation and feed carbohydrates in putrefaction. The different proteins vary in their predisposition to putrefy. The amount of heat used in preparing the food also plays a part. Proteins are changed by cooking, and in this state they undergo digestion by acid in the stomach more quickly. The rapid digestion in the stomach is the forerunner of rapid absorption in the intestines, so that very little putrefactive material reaches the large intestine, the place where protein putrefaction occurs.

Another dietetic task is the stimulation of the appetite. Appetite is indeed a very complex sensation, influenced, on the one hand, by sensory, secretory and motor functions of the gastrointestinal tract, and, on the other hand, by psychic causes. The general opinion is that things which are eaten without appetite are harmful to the organism. However, chemical studies of digestion have shown the importance of appetite in digestion to be overrated.

By what means can the appetite be stimulated? By thorough cleanliness in the preparation of the food; by the absence of kitchen odors from the sick room; by the pleasing appearance of dishes and foods, and by small portions, right temperature of foods, and the proper selection of menus. Very often an appetizer given before the main dish causes the production of very valuable stomach secretions. The Sakuska of the Russians, or a little caviar,

or a small amount of strong bouillon satisfies this requirement. Liquid foods provoke the secretion of gastric juice also. In preparing food, baking and frying have the advantage over boiling, because they tend to bring out flavor. However, they are often prohibited, thus making the preparation of appetizing foods quite difficult.

The selection of suitable spices for the individual case is a considerable task. Under the influence of their eastern neighbors, the Viennese came to employ very strong spices, while the French chefs use only very mild spices—a fact which makes their cooking more suitable for dietetic needs. Some alcoholic drinks, such as sherry and marasquino, contain such fine spices that very small amounts of them, added to the food, give it the desired good taste. Most of our foods already contain certain spices, but the flavor must be brought out by adequate cooking. The proper application of heat will do a great deal in this direction. Very often the addition of a little salt or sugar will help to increase the value of the spices naturally contained in the food. Improving the taste of food is one of the main duties of those responsible for its preparation, and the difficulty of doing this makes the term "art" justifiable.

The knowledge of how to thicken foods is also of importance. First, the food is brought from liquid or semisolid stages into solid stages and, then, a uniform mixture of liquid or semisolid material is reached. The belief that the liquid or semisolid form is ideal for the gastrointestinal tract was disproved by experiments made on large groups of people living on the same semisolid diet. It was shown that this type of diet leads to digestive troubles. This was probably due to psychic influences or poor mastication. Thorough mastication of foods is of great value. Besides semisolid and solid dishes we can prepare food also in a form which will be between these two states. Thickening of foods can be brought about in different ways. For in-

stance, such substances as gelatine, paste and some substances contained in fruits (pectins) are liquid when warm but become jelly-like when cooled. Because of this jellying property they are used to bring to solid stages other liquid or semiliquid substances. Thickening is also brought about through the coagulation of proteins. If such proteins are added to dishes in a cold state and heated afterwards, they become semisolid. The thickening of food can also be achieved by mixing separately the different components of liquid dishes, for example, watery and fatty substances mixed together form emulsions. The process of bringing fats to emulsions in watery liquids is very important dietetically because emulsified fat is more easily absorbed than that taken in the original state. Fat emulsions have the faculty of keeping in a state of emulsion further amounts of fat. Liquids with fat on the surface do not tend to stimulate the appetite. The formation of a fat emulsion aids spices when added, improving their taste. Gum arabic and lipoids are used for thickening just for medicinal purposes. Another kind of thickening is to keep in a state of suspension finely divided foods, mixing them with watery liquids (thick soups and sauces). Gum arabic and fat emulsion have this property.

We must now take up consideration of the organs not immediately concerned with the process of digestion—the organs of circulation, the nervous system, and the glands of internal secretion.

Anything which acts as a secretory stimulant on the digestive glands, especially on the stomach, also stimulates the other glandular organs, the nervous system and the organs of circulation. It is not desirable to stimulate directly organs already pathologically irritated, but very often such stimulation is very desirable therapeutically, so far as the effects on the more distant organs are concerned. For instance, the extractive substances of meat are the

most powerful provocative agents of gastric secretion, but, on the other hand, they also affect the nerves and blood-vessels and the protoplasm of glandular organs. Therefore, it is necessary to see that such substances are eliminated from food or are preserved, according to whether a stimulation of the more distant organs (glands of internal secretion, organs of circulation and kidneys) is desirable or not.

It is now believed that salt may cause edema (swelling of the hypodermic tissues), so foods are chosen which contain the least salt, especially in the case of nephritis (kidney inflammation). Starch and milk dishes seem to be most suitable here and, therefore, the salt-poor diet is still the best for the nephritic. The proteins taken with the food are generally broken down in the gastrointestinal tract. The heteroproteins which are ingested in minute amounts react on distant organs and the idea of making this fact responsible for bringing on certain skin diseases (urticaria, etc.) in connection with digestive disturbances seems worthy of consideration. The correct choice and the preparation of foods aids in the detoxifying of proteins. Intensive heat especially is of great value.

Putrefactive products of the intestines are certainly able to damage the glandular organs, as was found in the case of gout. Putrefaction in the intestines increases the uric acid in the blood. Furthermore, these putrefactive products may also act on the diseased kidneys or on pathologically stimulated glands. It is a factor also in rheumatism and it seems not improbable that different forms of neurasthenia may be due to this cause. Thus all the advice which should be of help in gout may also be applied in the diseases of glands of internal secretion and of the nervous system. Certain internal secretions play an especially important rôle. Most important is that of the pancreas, regulating carbohydrate metabolism. It is neces-

sary here to replace the harmful dishes (in this case carbohydrate food) by harmless ones, a principle which must be followed in the treatment of diseases of the more distant organs also.

Finally, let us consider briefly the pharmaceutical functions of various foods. The constipating effect of milk dishes, of cocoa and of some kinds of meat, for instance mutton, is well known. A new trend in modern organotherapy is the kitchen preparation of certain internal organs. This kind of preparation is not, however, as effective as the organic extracts prepared pharmaceutically. (See Gland Diet, among the Special Diets.)

CHAPTER II.

FOOD: ITS UTILIZATION IN THE BODY.

When we speak of the value of the individual foodstuffs we commonly employ the term "nutritive value," meaning primarily the caloric value. It is incorrect, however, to measure the nutritive value of foodstuffs by their caloric value only, because all foodstuffs have, in addition to their caloric value, specific properties which cannot be replaced by any other food. Proteins are of tremendous importance in the body metabolism, and we can speak of a food as possessing a high nutritive value only if it contains protein in a proportion suitable for utilization by the body. Furthermore, the properly balanced diet contains, in addition to protein, a certain quantity of nutritive salts.

So far as the caloric value is concerned, we must consider that within certain limits the foodstuffs in the three groups, namely: Proteins, carbohydrates, and fats, can be replaced by each other in the proportion of 100—100—44. That is to say, the requirements of the body can be covered (in calories) by the same quantity of either proteins or carbohydrates, or about one-half the quantity of fats. This substitution, however, is not absolute. They are mutually replaceable in so far as their value as a source of combustion energy is equal, but they must not be thought of as having the same nutritive value for the body. This is perfectly clear for the proteins, which, so far as they are destined to replace proteins of the body destroyed in metabolism, cannot have their place taken by one of the two other large groups of foodstuffs, namely, fats and carbohydrates. Only those proteins which are introduced

in a daily quantity far in excess of the above mentioned amount, and which, therefore, come under consideration as bearers of calories, and not as bearers of nitrogen, can be safely replaced by a proportionate amount of carbohydrates and fats.

Likewise, it makes a great difference to the body, either in health or in disease, whether we introduce into it the caloric equivalent in the form of carbohydrates or in the form of fats.

As a unit of measure for the combustion (caloric) value of human foodstuffs we use the physical term calorie, which may be defined as the amount of heat that is necessary to raise one liter of water one degree Centigrade. For the three large groups of main foodstuffs—proteins, carbohydrates and fats—the following figures give us the caloric value of one gram of each:

Proteins	4.1 calories.
Carbohydrates	4.1 calories.
Fats	9.3 calories.

We can take these figures as a basis for all our calculations, although there are certain differences in the various kinds of foodstuffs belonging to the three large groups. We can ascertain what percentage of each of the three important food elements is contained in our daily diet, and it is always easy to figure the exact caloric value by using the above figures as a working basis. The caloric requirement of an adult with an average development of subcutaneous fat is a practically constant quantity, differing, however, according to the amount of motion and work. This can best be expressed by the following table:

30–35 calories to 1 Kg. body weight daily at full rest.
35–40 calories to 1 Kg. body weight daily at slight work.
40–45 calories to 1 Kg. body weight daily at average work.
50–60 calories to 1 Kg. body weight daily at hard work.

With these figures the metabolism of a normal adult remains in a state of balance. Of course, it is impossible for an individual to introduce each day food of identically the same caloric value, but the differences are in the long run fully balanced, so that for years and decades many people keep their same body weight and their same state of health. This regulation of our nourishment in accordance with our instincts is one of the most wonderful phenomena of nature. Practically no one eats by consulting the caloric table. The maintenance of the correct balance of weight is regulated by our normal instincts of hunger and appetite, although the same quantity of different foodstuffs may vary in their caloric value 200 or 300 per cent. The more refined the food and the more distant it is from food furnished us by nature, the nearer lies the possibility that the hunger instinct is, so to speak, betrayed and does not represent the real need of food. The result is necessarily an increase or decrease of weight. The nature and feeling of the hunger instinct which we cannot localize is often actually betrayed by the condition of the gastrointestinal tract. Slight irregularities of digestion, nervous and psychic conditions often alter the appetite and bring to our conscious mind faulty indications as to the real requirements of our body for food.

From the above we conclude that in our present-day mode of living, which is so different on the whole from the natural, we cannot rely upon our instincts, but must resort to caloric tables for the determining of the quantity and quality of such foods as we eat. Precise calculation of calories is necessary only in extreme cases of obesity. In ordinary cases an approximate calculation is sufficient.

In addition to the influence of the quantity of work and motion on the caloric requirements of the body, we must consider many other factors, some of a subjective, others of an objective, nature. It is a well-known fact that people

of the same weight and height are often not satisfied with the same quantity of foodstuffs. There is apparently an individually different oxidation energy for the protoplasm of cells of different individuals, presumably affected somewhat by age and sex, nervous and psychic influences.

The external factors which have an influence on the number of calories required are, first of all, the weight and the surface of the body. A large proportion of all fat introduced into the body is destined to be burned in the cells in order to keep the body temperature at about 98° F. This makes it clear, that factors which favor the production and the giving up of heat must necessarily increase the need for additional food. In the adolescent body the weight increases in the third power, whereas the surface increases only as the square. It is, therefore, clear that the child and the young adult has a relatively larger body surface than the grown normal adult. The giving off of heat, and therefore the caloric requirement, is much greater for the child and adolescent than for the adult, consequently the rules governing the caloric requirements for the adult must be disregarded in computing the caloric need of a child. For example, a child needs three times as many calories as an adult for one pound of body weight. In a certain measure this also holds true for adults of different body weights and heights. Also, the fat individual of the same weight needs less calories than the muscular person, since fat-cells have a lower combustion quotient than muscle-cells.

Further, there is a tendency for the body to become over- and under-nourished regardless of the fat taken. The old idea that the combustion energy of cells can be increased by overfeeding has not been verified by modern investigations. Certain changes are produced by disease, especially by the glands of internal secretion, in fever and in pregnancy. Then, too, there are certain periodic changes

which occur in the same individual during the lifetime and for which we have no adequate explanation. Consequently we see that we must consider many other factors besides the mere following of a certain scheme of calories: first of all, the individual idiosyncrasies of metabolism; the state of nourishment; especially the quantity of fat and muscle; the age and the height.

PROTEINS: THEIR DIGESTION AND UTILIZATION.

Among our main foodstuffs, proteins occupy a distinctive position inasmuch as they contain, in addition to the fundamental elements, other important organic foodstuffs, namely, carbon, hydrogen and oxygen, also nitrogen, and of the mineral substances sulphur in large amount. It would be far beyond the prescribed limits of this book to go into great detail concerning the exact chemical nature of proteins. It is only necessary to mention that although they are in the main of animal origin, they are also to be found in cereals, especially the legumes. In addition to the legumes the most important bearers of proteins are eggs, cheese, milk and meat.

Through the influence of the pepsin and hydrochloric acid of the stomach, and the trypsin of the pancreas, there occurs a splitting of the highly organized proteins of the food into nitrogen containing compounds, and this protein splitting is continued until it reaches a point where the body is able to build up its own proteins. The mixture of these lower compounds in the different types of proteins varies greatly. It is clear that the more mixed our food, the greater the probability that it will give to the body all the different necessary groups in the best selected form. This ideal state of nutrition obviously cannot be attained if a single protein only is present in our food, as occurs, for example, when the diet consists of milk alone. How-

ever, even when the proteins are confined to a very few varieties, the body apparently knows how to react to reach the best result. There is no great difference in the chemical composition of various types of proteins. Practically all the different varieties of proteins, whether of animal or vegetable origin, have the same or almost the same nutritive value. In pathological conditions, we have to be more careful in the selection of proteins—a problem which we shall take up in more detail later.

An important fact which must be considered in connection with the nourishment furnished by proteins is the putrefaction which proteins undergo in the large intestine. The degree of this putrefaction, occurring under the influence of certain germs, varies according to the different kinds of proteins ingested. The absorption of the products of putrefaction is supposed to have a deleterious effect on the body tissues, especially on the circulatory system. This putrefaction is, however, counteracted by the lactic acid fermentation resulting from the digestion of carbohydrates. This combating agent is supposed to be present chiefly in the bacteria of a certain kind of buttermilk, for example the Bulgarian buttermilk. Exact proof of this, however, is still lacking, but it is a fair conclusion that the proper mixture of proteins and carbohydrates, as it is represented in our so-called mixed diet, is the best way to keep down to a normal level putrefaction in the intestines.

CARBOHYDRATES: THEIR DIGESTION AND UTILIZATION.

Carbohydrates are organic compounds of carbon with hydrogen and oxygen in the same proportion as they are contained in water, and with the sole exception of the sugar of milk, they are of vegetable origin. They represent our most important foods and are burned in the body to water and carbon dioxide. To the carbohydrates

belong starch and the many varieties of sugars which are chemically differentiated by the number of carbon atoms united in the molecule. Most important of this group is starch. This cannot be absorbed directly from our intestines but it is split by the ferments of the mouth and intestines to glucose, which can then be directly absorbed. This splitting occurs most easily and perfectly when starch is first rendered soluble by cooking. Therefore, the application of heat and water is most essential in the preparation of the simple starchy foods, the most important of which is bread. Cellulose is another carbohydrate which cannot be absorbed, but plays, nevertheless, an important rôle in our nourishment as it gives the necessary bulk for our stomach and intestines to work on, and thus increases their motility. This type of carbohydrate is the main constituent of all vegetables and fruit.

The most important varieties of sugar are saccharose, lactose, maltose, glucose and levulose. Only glucose and levulose can be burned directly, whereas the other varieties must first be changed in the intestines to glucose. Saccharose (sucrose) is the common sugar used in cooking, and represents the overwhelming proportion of all sugar which we take with our meals. Milk sugar, like malt sugar, is used in a pure state only as a body builder or tonic for children. The absorption of carbohydrates is very perfect, and even upon ingestion of very large quantities of food containing carbohydrates, not more than 2 or 3 per cent. appear in the stools. Very slight traces of sugar may appear in the stools if pathological conditions, such as diarrhea, prevent good absorption.

After digestion the carbohydrates are stored in the liver as glycogen. They are deposited in the liver-cells and from the liver are given up to the circulation according to the requirements of the body. This occurs in the form of dextrose, which, aided by a certain ferment, is derived

from glycogen in the liver. The ability of the liver to store carbohydrates has certain limits. When too much glucose enters the liver the greater part of it goes into the blood, and if the sugar in the blood exceeds a certain concentration it then passes through the kidneys and appears in the urine. Experimentally this happens whenever more than 150 grams of sugar are eaten at one time. When the liver becomes chronically overburdened with glycogen the latter is changed into fat. Whether this change takes place in the liver- or in the fat- cells has not yet been determined. This occurrence, however, is one of the most positive facts in the science of nutrition. It is an important and interesting phenomenon that the working muscle can burn carbohydrates only, never fat. Furthermore, as the passage of glycogen from the liver to the muscles is not sufficient to cover the requirements of working muscles, we must suppose that there occurs a change of fat into carbohydrates in the nature of a chemical reaction which again probably takes place. All this is mentioned because it shows us that in metabolism fat can be formed from carbohydrates and carbohydrates from fat. In other words, these two large and important groups can be replaced by each other.

FATS: THEIR DIGESTION AND UTILIZATION.

The fats in our food are to a great extent of animal origin and only in a small part of vegetable origin. They are included in the protoplasm of cells and are found in the animal body in the fat tissue between the muscle bundles and the bone marrow, as the covering of the main glands, and also in milk and the yolk of egg. The vegetable fats to be considered are the fat of olives, of nuts and of legumes.

Chemically the fats are compounds of glycerin and the higher fatty acids. The melting point varies according to

the type of fat, but we ingest in our ordinary diet a mixture of fats, the melting point of which corresponds to human fat. Now the nutritive value and the caloric value of the various types of fat differ. We know from experience and from animal experimentation that there exist in the adolescent body certain dissimilarities in the assimilation of fat. For example, butter and the fat of the egg yolk increases the growth of the body to a greater degree than does lard. The value of fat lies in the fact that it offers to the body a source of energy greater than any other foodstuff. For the same volume and weight, no other foodstuff contains as many calories (9.3 calories to one gram). This is at the same time an advantage and a disadvantage: a disadvantage inasmuch as obesity may result from an excess of fat, whereas a diet too poor in fat will make it impossible for the body to reach a normal state of nutrition.

The digestion and absorption of fat takes place in the small intestine, and it is chiefly the action of the ferments of the pancreas which causes the splitting of the fats, while the bile plays only an auxiliary rôle. The digestion consists of the splitting of fats into glycerin and fatty acids, both being separately absorbed. To a very small degree even the stomach is able by a specific ferment to split up the fats, but this is to be considered true only for the fats belonging to the lower fatty acids, contained in but small quantities in our normal foods.

The digesting and absorbing power of the intestines for fat is very great. About 300 grams a day can be easily absorbed, and even with so great a quantity no more than 3 per cent. to 5 per cent. reappear in the stools. The absorption of fats is chiefly affected in pathological changes of the intestines, as in acute inflammation of the small intestine, where the stools are abnormally rich in fat. This is most conspicuous in cases where secretions of the liver

and pancreas cannot reach the intestines because their ducts or canals are obstructed. There is then a typical change in the stools. They are clay-colored and have an extremely putrid odor.

Of the absorbed fats the larger part, about 60 per cent., flows through the large lymph vessels of the intestines into the circulation, whereas a smaller part, about 40 per cent., makes its way to the liver. Probably all fat is immediately stored away, whereas proteins and carbohydrates, a short time after being digested, are split up and consumed by the body. Fats are probably first stored after ingestion and later brought into the circulation and burned. In this change and transportation of fat, the liver plays an essential part. The glycogen storage of the liver is decreased in hunger or intensive muscular work and in this way the fat is probably transported from the fat stores to the liver and there changed to sugar. This process occurs in the body continuously.

Closely related to the true fats are the lipoids, chemical compounds which are not without importance in nutrition, because they play a part in all changes which occur between the cells and their surroundings. The most important of the lipoids are lecithin and cholesterin. Lecithin and lecithin-like bodies are found for the most part in all animal and vegetable cells, especially in brains and cereals and egg yolk. Lecithin is very essential for the central nervous system and for the growth of the body. For this reason lecithin-containing foodstuffs and drugs are much recommended. It is certainly more advisable to give lecithin-containing foodstuffs as a diet for sick and convalescent patients, than to give expensive and probably less effective lecithin-containing drugs. There is a considerable amount of cholesterin in all of our foodstuffs and in all body tissues. The quantity of cholesterin contained in the blood varies considerably under different physical

and pathological conditions. The excretion of cholesterin crystals in the gall-bladder, as found in gall-stones, is well known. In pregnant women the blood is very rich in cholesterin. This is considered to account for the gall-stones so often found in multiparous women. The question of the importance of cholesterin in nutrition has not been investigated sufficiently to justify our drawing any conclusions regarding its nutritive value.

WATER.

For the economy of water in our body the same physical laws hold good as in nature. In normal nutrition an adult takes about 2000 grams of water a day. It is the vehicle of all introduced foodstuffs and has, further, the physiological task of keeping the osmotic pressure of the body at a constant level. This osmotic pressure is dependent, first of all, upon the salt content of our food and some other organic compounds, as for example, sugar. In view of the fact that it is well known that sugar increases the need for water, we can conclude that the main purpose of water drinking is not to dilute the urine but to keep the osmotic pressure at a certain level. Given the same type and quantity of food, it is an interesting fact that the desire for water varies greatly with different individuals. Whereas one person after a meal containing salt is very thirsty for several hours, and is obliged eventually to increase the quantity of water greatly, another will not feel this need at all. It is hard to say how far habit, individual sensibility, concentration of the blood, or the state of the kidneys is responsible for this. Increased introduction of water does not essentially increase the water content of the tissues in a healthy person, but diminished introduction of water may easily decrease the water content of the body.

For a healthy vascular system the drinking of large quantities of water is not of any importance, but in cases

where the heart and blood-vessels are impaired in their function we must restrict the intake of liquids. Under pathological conditions there is an increased desire for water, as in all febrile states, after diarrhea, severe loss of blood, in certain kidney diseases and in diabetes.

SALTS.

Although salts have no nutritive or caloric value, nevertheless they are essential to the body. It is a commonly known fact that the salt content of a mixed diet is sufficient for our requirements. The most important mineral substances contained in our main food materials comprise the common cooking salt, potassium salts, calcium salts, magnesium, iron and the phosphates. A fault of the present method of regulating nutrition is that it takes into consideration our caloric requirements and the proper proportion of proteins in the diet, but does not consider the necessary amount of salts. For example, an exclusive milk diet contains much calcium and phosphates, but almost no iron, and the diet cures which are used in kidney, stomach and intestinal diseases have usually an incorrect distribution of salts. The dislike of the patient for those foods is often explained by the faulty mixture of salts. Phosphates are contained in all our foodstuffs, for the most part in organic compounds. Milk, cheese, egg yolk, meat and some vegetables contain the highest percentage of phosphates. The average quantity of phosphates in our food is from 2 to 6 grams daily.

Sodium chloride (common cooking salt) is the only salt which we take in a chemically pure state and which is always present in all foodstuffs of animal origin. It is the most important regulator of the concentration of the blood, and by drinking water or by taking salt with our meals we regulate the osmotic state of the blood. The normal mixed diet contains about 12 to 15 grams of common salt. If we

withdraw salt for any length of time from our diet all the tissues, especially the skin, become poor in salt, but we do not know of any real disadvantage for the body, except the loss of hydrochloric acid in the stomach and the poor appetite which results in consequence. Regarding the restriction of salt in certain diseases of the kidney and vascular system, more will be said later in the chapter on salt-free diet.

The potassium salts of our foods play an unimportant rôle. If they are medically administered, they have a distinctly poisonous effect on the central nervous system and the heart, but this does not come into consideration in the question of diet, even if it contains a large amount of meat. In certain kidney diseases it may be of importance, inasmuch as the potassium salts hasten the onset of uremic symptoms.

Next in importance to cooking salts are the calcium salts. Milk, vegetables and legumes are foods containing large amounts of calcium. The daily quantity of calcium salts which can be introduced and excreted varies from 1 to 10 grams. It is thus seen that there exist wide variations in the ability of the body to handle calcium. It is not known that even if we eat, for a long time, a diet rich in calcium, the health is impaired in any way. If the introduction of calcium salts goes below a certain minimum, it would make considerable difference in the adolescent body and also in certain diseased conditions. In a great number of diseases the introduction of calcium salts is supposed to have a highly curative effect. Particular mention should be made of the anti-inflammatory and anti-bacterial effect of calcium salts.

Magnesium, which belongs to the same group of elements as calcium, has a physiologically antagonistic effect to calcium. For this reason several scientific investigators have emphasized the importance of a certain proportion of

magnesium and calcium salts in our foods. For all practical purposes we never reach the point where we must take into consideration the quantity of magnesium in our food.

IRON.

The entire iron content of the body of an adult is about 3 grams, and five-sixths of this quantity is contained in the coloring matter of the red blood-corpuscles, hemoglobin. It should be stated here that milk is a food which contains very little iron, a fact to be borne in mind when we are obliged to order an exclusive milk diet for adults. Besides the hemoglobin of the blood, iron is contained in large quantities in the liver, spleen, pancreas and many glands. The superfluous iron in our diet is deposited for the most part in the liver, whence it is given up gradually. All green vegetables, especially spinach and lettuce, the yolk of eggs, fresh fruits, and the blood of animals contain iron in large quantities.

INDIRECT FOODS.

Organic Acids.—Organic acids play a more important part with reference to taste than actual foodstuffs. They are contained in fresh fruits in considerable amounts. Lemons have the highest percentage of acids, from 5 to 7 per cent., this percentage corresponding closely to the acidity of vinegar, so commonly used in the kitchen. In general, fruits do not contain more than ½ to 2 per cent. of acids.

Of the organic acids of animal origin, lactic acid and butyric acid play an important rôle in our nutrition. Even if the food is entirely free from any acid, the body derives some acid from the stomach and intestines. Lactic acid fermentation is a normal process in our small intestine, and butyric acid and lactic acid are produced from the fermentation of cellulose. Organic acids are very perfectly

oxidized, and only unimportant traces pass into the urine. Although the caloric value of these acids is very low, they play a not unimportant rôle in nutrition, aiding in an indirect way digestion and absorption. To begin with, all organic acids have a stimulating effect on the mucous membrane of our intestines, in the upper portion increasing secretion and in the lower portion promoting peristaltic movement. As they reach the lower part of the intestines they hinder the development of the bacteria causing protein putrefaction. The buttermilk and zoölak treatment is based on this fact.

It may be well to mention here an experiment, which shows that the drinking of too much buttermilk may, perhaps, be not without harm to the body. It has been proved experimentally that dogs and rabbits fed too long upon lactic acid show changes in their arteries, histologically the same as arteriosclerosis in human beings. Although the metabolism of those animals is essentially different from the human, this phenomenon leads us to question the complete harmlessness of drinking buttermilk in too great quantities. So far as the lemon cure is concerned it should be mentioned that citric acid precipitates the calcium in the body cells, and we should, therefore, avoid lemons in all cases where it is important to preserve the calcium content of the body.

Alcohol.—There are some foodstuffs which are ingested, not for their caloric value, but for their stimulating effect on the stomach, the intestinal tract, and the nervous system. Alcohol is the most important of these foods. The production of alcohol is as old as mankind, and it is prepared in so many different ways that we can describe but the most important of them.

Alcohol is produced by the fermentation of sugar by yeast. In this fermentation, besides the main product of alcohol, many other organic bodies are produced whose

qualitative and quantitative mixtures are essential for the taste and odor of the beverage. Even if normal food is free from alcohol, from other carbohydrate-containing food there are produced certain amounts of alcohol in the stomach and intestines, this being accomplished by the action of yeast which is always present in the stomach and intestines. Under pathological conditions, especially if the pylorus (the exit of the stomach) is obstructed, this yeast fermentation and the alcohol produced by it can be carried to such a degree that a state of chronic alcoholic autointoxication may possibly result. This alcohol produced by fermentation in the gastrointestinal tract is responsible for the alcohol which the human blood contains in small quantities, increasing about 50 per cent. after meals.

Of the physiological effect of alcohol we must first mention stimulation of the gastrointestinal tract. Alcohol increases production of saliva in the mouth and production of hydrochloric acid in the stomach. This does not occur in higher concentrations, nor in cases of chronic abuse of alcohol. Alcohol belongs to that branch of foodstuffs which are very quickly absorbed and burned to carbon dioxide and water. After drinking alcoholic beverages the alcohol percentage of the blood reaches the highest point in about two hours, stays at this point about five hours, and decreases to normal in twelve to fourteen hours. This cycle occurs more quickly in people accustomed to drinking. Alcohol is deposited for the most part in the liver and brain. The liver is the first in the path which alcohol takes after leaving the stomach; this may be one of the reasons why in cases of chronic abuse of alcohol the liver is so often affected. The greater part of alcohol is immediately burned in the circulation, and only a small part is given up by the urine. Alcohol has a high caloric value (7 calories to one gram), as well as a certain nutritive value, therefore other foodstuffs, especially fats, can be

replaced by it. This fact and the increased secretion of the digestive glands brought about by alcohol is the reason for its use as a nutritive foodstuff, especially in the case of patients convalescing from exhaustive diseases. There is no doubt of the good effect of alcohol in severe cases of diabetes. In this disease it may sometimes have a life-saving effect in threatened coma when alcohol is used as a stimulant for the heart. In contrast to these good effects are the deleterious results of chronic alcoholism on almost all the organs of the body. The effects of alcohol on the central nervous system have been well studied through experiment. Chronic cases of alcoholism often result in a degeneration of the ganglion-cells of association fibers, and it may also leave symptoms of degeneration in the descendants. Taking all these facts into consideration complete prohibition of alcohol is perfectly justified and should be accepted as a blessing for health's sake. Unfortunately, deeply rooted instincts are responsible for the craving for alcohol, and it will take generations for mankind to become accustomed to prohibition.

Spices.—Spices are substances which are eaten not for their nutritive value but for their stimulating effect on our senses of taste and smell. So far as the nutritive value, caloric value and protein content are concerned, spices are of no importance. A large majority of them are of vegetable origin, although we count meat extracts among the spices too. Chemically, they belong to the group of etheric oils. The most important spices are mustard, ginger, clove, pepper, wintergreen, bay, cinnamon, saffron and allspice. Although the nutritive value of spices is negligible, they have an important indirect effect on nutrition, inasmuch as they increase the appetite and improve the taste of many valuable foodstuffs. Further, they increase secretion of the glands in the stomach and intestines. If they are used in too great amounts or in too concentrated form,

this stimulating effect can be increased to the point of injury, especially upon the organs of digestion. Unfortunately overspicing is very common in modern cooking, and certain stomach diseases may be the result of this kind of cooking. In a broader sense we class vinegar with the spices. The vinegar that is ordinarily used in the kitchen has a percentage of 3 to 6 per cent. of acetic acid. The percentage of vinegar in the stomach content should not be more than 0.3 per cent. although in the presence of much sugar and oil the percentage may be a little higher. Vinegar greatly increases the production of saliva and the gastric hydrochloric acid. It should not be used in cases in which there is a tendency to hyperacidity of the stomach.

Tobacco.—Tobacco was brought from its home in the West Indies to Europe by the Spaniards in 1520. The name is derived from Tabago, an island belonging to the Antilles. Nicotine, which is contained in the leaves, was named after the French Ambassador to Lisbon, M. Nicot. He first sent powdered tobacco leaves to the French queen, who used it as snuff, as a remedy against headaches. The poisonous effects of snuffing, smoking and chewing tobacco were soon recognized, and all the governments of Europe have been fighting against the use of it for centuries. Notwithstanding this, the use of tobacco spread rapidly over the whole world and it is today, next to alcohol, the most important poison we use for pleasure. The total production of tobacco is about 1,000,000 tons a year, of which the greatest part is produced in Asia and America. By tobacco we mean the leaves of the tobacco plants. These must undergo a certain preparation—in the main drying and fermentation at a certain temperature. In America this process is carried out in a single procedure, the temperature being slowly increased from 27 to 77 degrees centigrade. At the lower temperature the fermentation takes place, which gradually stops as a certain degree of heat is

reached and the drying begins. It is probably due to this process that the quality of American tobacco is so high. When tobacco is transported in bales there probably occurs additional fermentation. This process accounts for the fact that cigars made in Europe from American tobacco are very inferior in quality. Tobacco contains a variety of substances which impart to it a typical taste and the well-known physiological effect. It contains nitrogen bearing substances of which the most important are nicotine, fats, etheric oils, extractive substances, organic acids and mineral products. The most important of all these, predominating in its physiological effect, is nicotine. Nicotine is a colorless and oily liquid which in its taste and smell bears no resemblance to tobacco. The nicotine content of the dry fermented tobacco leaves varies from small traces to about 8 per cent., the average for most of our cigars and cigarettes being about 2 per cent. Several processes are employed by which nicotine is partly withdrawn from the tobacco and many sorts of cigars and cigarettes are put on the market under the name "nicotine free." A complete withdrawal of nicotine from tobacco is impossible, although with the best processes there is a 70 per cent. loss of nicotine. The smoking of one gram of tobacco yields about 650 cubic centimeters of fumes. In these fumes are contained besides nicotine, carbon-monoxide, hydrosulphate, ammonia, cyan and pyridin.

All these substances are contained in small quantities only, and their effect on health is therefore negligible. An exception is the so-called pyridin, which probably arises from the dry distillation of the protein bodies in tobacco. It is difficult to say how much this pyridin adds to the poisonous effect of smoking. It is certainly not as important an element as nicotine. Only a certain percentage of the nicotine contained in tobacco comes into the circulation. According to the kind of tobacco and the form of

smoking, from 5 to 30 per cent. of the contained nicotine is absorbed.

The physiological effects of nicotine are exerted, first on the vascular system, then on the nervous system, and finally on the gastrointestinal tract. The effect is first a stimulating one, but after prolonged use in higher concentration its action becomes that of a paralyzant. Catarrhal inflammatory conditions in the mouth and throat of smokers are well known. In smokers who have the habit of inhaling, catarrhal changes occur even in the bronchial tubes. In the stomach, smoking causes hyperacidity and in excess it leads to chronic catarrh. In young people especially, smoking decreases the appetite. It slightly increases the movement of the bowels, but habitual smokers usually suffer from constipation, sometimes to a considerable degree. The injurious effect of nicotine on the vascular system is mostly on the arteries, bringing about a spastic condition of the arteries and favoring the development of arteriosclerosis. It has been shown experimentally that nicotine increases the arterial tension.

Among the nervous symptoms of a continuous use of nicotine should be mentioned headaches, dizziness, insomnia and eventually muscle tremor. The typical nervous disease produced by excessive use of tobacco is neuritis which, according to the degree of misuse, occurs in all forms and affects almost every nerve. Although there is ample proof of the injurious effect of nicotine on the health it must be admitted that there are many people, who from youth have been excessive users of tobacco, who never show any ill effects. In old people especially, smoking is often the only pleasure in life. If tobacco produces any symptoms of disease it is better to reduce the quantity and give definite instructions regarding its use, instead of forbidding it absolutely. It is well to remember that for smoking, cigars, cigarettes, and tobacco should be stored

for a time; brands which have a high percentage of nicotine should not be smoked at all; not more than three-quarters of a cigar or cigarette should be smoked, because nicotine collects in the stub. Further, cigars and cigarettes are best smoked by using holders which can be filled with nicotine absorbing cotton. There is, in certain individuals, a high sensitiveness to nicotine, especially in diabetes, in all cases of kidney diseases and in the intoxication of alcoholism and morphinism. In all such cases it is best to prohibit smoking entirely.

Tea, Coffee and Cocoa.—Tea, coffee and cocoa contain certain drugs which in a pure state have considerable effect on the body. Coffee and tea contain caffeine, and cocoa theobromine. These drugs affect, first of all, the organs of circulation and, second, the nervous system. The effect on the nervous system is one of stimulation. The effect on the organs of circulation is characterized by dilatation of the blood-vessels, in consequence of which there is a stronger blood flow, especially in the skin. In addition, all these foodstuffs have a considerable stimulating effect on the mucous membranes of the stomach. They are usually taken as a common beverage in the morning, and most people do not feel ready for the day's work until they have taken a cup of one of them. Many people have, in addition, the habit of taking a cup of coffee immediately after meals. This may be considered as acting as a narcotic against the unpleasant sensation sometimes produced by the work of digestion. The nutritive value of these products is an indirect one.

Directly they have no caloric value, and for this reason we mix them with milk and sugar. Coffee in particular increases to a considerable extent the production of hydrochloric acid in the stomach, as a consequence of which we forbid coffee in all cases of hyperacidity, especially in cases of ulcer of the stomach. We usually give tea with sugar

and a little milk as the only nourishment whenever an absolute withdrawal of food is indicated, as for example, in the first few days after operations, bleeding of the stomach and intestines, peritonitis, etc. We must consider that tea, especially if but little sugar is added, counteracts thirst more than does pure water.

While speaking of cocoa it must be mentioned that it contains a considerable amount of fat, namely cocoa butter. This fat is usually removed in some degree from the better grades of cocoa powder in use. It must also be considered from a nutritive standpoint. In the small quantity that cocoa is used its most important function is correction of the taste of milk. In contrast to cocoa which is thus commonly used in the form of addition to milk, we use chocolate in a more concentrated form. Chocolate is a mixture of cocoa powder with sugar held together by adding a little cocoa butter. The following table (von Noorden-Salomon) gives the composition of an average cocoa powder or chocolate.

The physiological effect of the theobromine contained in cocoa resembles the effect of the caffeine of coffee, but it is only about one-third strength.

	Cocoa. Per cent.	Chocolate. Per cent.
Water	5.5	1.6
Proteins	23.6	6.3
Theobromine	2.6	0.6
Fat	20	25
Sugar	2.4	53
Starch	5	5
Calories for 100 gr.	430	470

VITAMINS.

The vitamins are vitally important chemical compounds contained, in larger or smaller quantities, in all natural foodstuffs of animal origin. They can be destroyed by mechanical or chemical forces or by the application of heat. If our foodstuffs in some way or other are lacking in these

vitamins, then a food which meets the requirements of the body so far as the caloric and protein content is concerned becomes insufficient for nutrition. Probably, the vitamins are compounds which the body requires for the building up of its cells but which it cannot produce itself except to a very limited degree. It is surprising that the content in vitamins, especially in foodstuffs of the vegetable origin, is not the same in all parts of the same food.

For example, the vitamin of rice is contained in the "skin" of the rice kernel, which is often removed in "milling" or "polishing" the rice before it is placed on the market. The ingestion of such rice frequently leads to deficiency diseases known as beriberi and scurvy in people living principally on rice, as the Chinese and Japanese. In Japan the vitamin-containing portion of rice is manufactured into an extract which is added to all rice foods. This substance is known as oryzanin.

We must also mention that each type of foodstuff, protein, fat and carbohydrate, has its own specific kind of vitamin, and, therefore, it is insufficient to give only one kind of vitamin in all diseases which we regard as being produced or increased by a vitamin deficiency. All fresh fruits and vegetables, milk, butter, eggs and meat (if neither boiled nor heated too long) are rich in different vitamins.

RESIDUE.

All the foodstuffs contain substances partly organic and partly inorganic in their chemical nature, which are not absorbed at all and which do not enter the circulation. These are called residue. In the foodstuffs of animal origin they do not play an important part, but they are abundant in vegetables. They are found for the most part in the covering (cellulose) of the cells and in the pits of fruits, which always form an important percentage of those foodstuffs. If we remove the residue from the foodstuffs,

which can be done partially in different ways, then we facilitate the work of the stomach and intestines, but it is important to remember that this residue contains the necessary salts, and further that it represents the desirable stimulant for the peristaltic movement of the intestines. Many cases of chronic constipation can be explained by the lack of "roughage" in the food, and these cases are improved greatly if we add considerable quantities of rich "roughage" or residue-containing vegetables.

CHAPTER III.

VARIOUS TYPES OF FOOD.

In the normal diet there is a balance in the body, not only of calories, but also of nitrogen. That is to say, there is excreted in the urine and stools together as much nitrogen as is introduced to the body by food.

Under conditions which are caused partly by changes in the food and partly by pathological changes in the interior of the body, this normal state of nitrogen balance can be altered and, in consequence, there results an increase or decrease of proteins in the body. This first happens physiologically in adolescence or during convalescence after disease. A true overfeeding with protein in the sense of a considerable increase of protein in our body does not occur, for although the body is able to retain a certain quantity of protein in the tissues, if we overfeed it for a time with protein, this storage of protein never reaches a considerable degree, nor does it last a very long time. The body cannot store proteins for future use as it does fats. For this reason overfeeding with the high protein diet increases the fat but never the muscle. These conditions are changed if we combine protein overfeeding with systematic muscle work. The body is then able to increase the volume of muscle considerably and in this sense we speak of a storage of protein in the body. Even this, however, is limited to a certain age. Precise experiments show the following results:

Considerable increase in the volume of muscle work exists only in early years. After the thirtieth year of life, with some individuals somewhat earlier, with others somewhat later, the body loses the ability to increase to any

considerable extent the volume of muscle and after a certain age any increase of the muscle volume can no longer be brought about.

A loss of protein in the body occurs physiologically in old age, in protracted inactivity of muscles (especially in the case of people who are accustomed to vigorous muscle work), and in time of disease. In fever, the loss of protein can reach such high degrees that the higher splitting compounds of protein, such as albumoses and peptones, appear in the urine. To what degree this condition is caused by the different kinds of warmth regulation, and how far the toxins of bacteria play a rôle, is not exactly proved.

It is perfectly clear that in all cases of undernourishment the body loses protein, but it must be mentioned that the body has, to a certain degree, a system of protein saving when small quantities are introduced over a long period. This, of course, can go on only to certain limits. All this naturally leads us to the question as to what is the normal requirement of protein, what is the lowest and the highest quantity of protein that can be given, and what is the daily quantity that is most suitable to the body? A great number of very exact experiments have been made with the following results:

For the average adult of about 150 pounds weight, under normal conditions of the digestive organs, and with a normal amount of muscular work, we can say that the minimum quantity of proteins is about 30 grams a day (this means rough proteins, which corresponds to a quantity of 150 grams of raw meat, or to four eggs, or one quart of milk). This amount is a minimum which cannot be maintained for any length of time and which is of theoretic value only.

As a distinction from this theoretic protein minimum, we call a suitable protein minimum that quantity of protein which can be given over any length of time, if disease

or conditions of extreme poverty necessitate the saving of protein. This daily quantity is about 70 grams for the average adult. This amount is not much less than the quantity of proteins which we call the desirable daily quantity. These amounts cannot be defined as the extreme limits of minimum and maximum through exact experiments on animals and humans, but only by experience and habits of life. According to race, the habits of the different countries, and the condition of the material wealth or poverty, the normal mixed diet of the adult varies from 70 to 130 grams of protein daily. This quantity we consider the most suitable for the average adult, and a little more is probably better than a little less so far as nutrition is concerned. There is no doubt that health is just as compatible with a quantity from 70 to 90 grams daily as a quantity from 100 to 130 grams daily. It is interesting in connection with this question to consider conditions in different countries. Strong and progressive races have always been strong consumers of protein, as for example, American, English, German and Scandinavian people, although in contrast we must consider that the Japanese have risen, if not bodily, at least culturally and intellectually, very remarkably in a short time, yet they consume less protein than other races.

Considering all these facts we come to the conclusion, that it is necessary and advantageous for the health and strength of people to decrease the consumption of protein but not below certain limits. So far as the upper limits of protein consumption is concerned we can say, that for the healthy person a daily quantity of protein that goes over 150 grams is certainly not beneficial to the body. At first thought it seems incomprehensible that we do not cover a larger part of the requirements of calories in our food by protein, since the caloric value of proteins and carbohydrates is almost the same and, further, the protein-contain-

ing food is more palatable. To understand this we must bear in mind that the mechanism of burning carbohydrates in the body is a much simpler one than that of proteins, and there are not so many split products of deleterious effect for the body as occur in the digestion and absorption of proteins. The introduction of protein in too great quantity would first of all overburden the liver, vascular system and the kidneys in a way which in a short time would be harmful for the body. These conditions can be studied exactly, especially so far as the liver is concerned, in diabetes. Gout is commonly considered due to excessive meat consumption. In people who are large protein consumers we find, besides, that there exists a tendency to constipation and dry stools.

Another fact that must be mentioned is the increased putrefaction of proteins in the large intestine, for which we have an exact measure in certain substances which are absorbed and detected in the urine. The degree of this putrefaction in the large intestine can be increased to the extent where real disease is caused. In fever and Basedow's disease, a high protein-containing food is certainly injurious. The importance of protein in a vegetarian diet also should be mentioned. We must differentiate between the strict vegetarian diet and one which allows some products of animal origin, such as milk, butter, eggs and cheese.

It is no doubt a fact that the proteins of vegetable origin have the same nutritive value as the proteins of animal origin, but considering the difficulty of digestion of some protein-containing foodstuffs of vegetable origin, especially the legumes, we can say that only people with very strong digestive systems are able to digest the large quantity of vegetable foodstuffs which is necessary to provide the body with sufficient protein. Therefore, we can favor only that kind of vegetarian diet which allows, besides the foodstuffs

of vegetable origin, some animal products such as milk, eggs and cheese. It is beyond doubt that meat and the other products of slaughtered animals are essential for the nutrition of human beings.

FOODS WITH PROTEIN AS THE MAIN ELEMENT.

MEATS.

The term "meat" includes not only the muscle portion of the animal but also other parts, as the brain, liver and lungs. The essential parts of meat are protein, extractives, fats, salts and water. By extractives we mean water-soluble, partly nitrogen-containing, partly nitrogen-free, elements, of a characteristic taste and smell and typical physiological influence on the body, the exact chemical composition of which is as yet but partly known. Among the nitrogen extractive substances should be mentioned the purin bodies, which are mainly present in the tissues rich in cells, as for example the liver. Fat according to the degree of feeding is found in different quantities in connective tissue. The percentage of salts varies from 1 to 1½ per cent. The amount of water lies between 74 and 78 per cent. In cuts of meat which are rich in fat the amount of water can be as low as 60 per cent.

The amount of purin bodies is of especial importance because of their well-known influence on the formation of uric acid and in kidney diseases. Potassium salts and phosphates are the most important mineral matters in meat.

The exact composition of different kinds of meat is given in Table I.

THE NUTRITIVE VALUE OF MEAT.

All kinds of meat of different animals have their characteristic taste, and if not strongly spiced we can discover the identity after it has been cooked. According to the

TABLE I.

	Water. Per cent.	Proteins. Per cent.	Fats. Per cent.	Salts. Per cent.	Calories. 100 Gm.
Meats.					
Beef, fat	56.2	18.0	25.0	0.80	306
Beef, lean	75.5	20.5	2.8	1.20	110
Veal, fat	69.0	19.5	10.5	1.00	178
Veal, lean	77.8	20.0	1.0	1.20	91
Lamb, lean	76.0	17.1	5.8	1.20	124
Pork, fat	45.3	12.7	41.3	0.70	436
Pork, medium fat	57.4	17.6	24.0	0.95	295
Pork, lean	72.5	20.1	6.3	1.10	141
Hare	74.2	23.3	1.1	1.18	107
Rabbits	66.8	24.5	9.8	1.17	195
Deer	75.8	19.8	1.9	1.13	105
Chicken	76.2	19.7	1.4	1.37	99
Turkey	65.6	24.7	8.5	1.20	180
Wild duck	70.8	22.6	3.1	1.09	131
Goose, fat	38.0	15.9	45.6	0.48	489
Pigeon	75.1	22.1	1.0	0.76	100
Fish.					
Salmon	64.0	21.1	13.5	1.22	212
Eel (river)	58.2	12.2	27.5	0.87	306
Eel (sea)	72.9	18.0	7.8	1.00	145
Herring	75.1	15.4	7.6	1.64	134
Mackerel	70.8	18.9	8.8	1.38	156
Carp	74.0	18.2	7.0	1.09	140
Oysters	80.5	9.0	2.0	1.96	82
Lobsters	81.8	14.5	1.8	1.70	77
Crabs	81.2	16.0	0.5	1.3	74
Turtles	79.8	18.5	0.5	1.2	80

species of animal the meat has different degrees of tenderness; the cause of this is the quality of the connective tissues. On the average, young poultry, some fish and calves give the tenderest meat, although first-class beef is also very tender. The toughness of meat troubles the sensitive stomach and decreases the meat's wholesomeness and nutritive value. In the diet of the sick we take into consideration primarily the tenderness of the connective tissues and the amount of fat contained in the meat. The opinion that white meat, especially poultry, is more suitable for gout, diabetes, liver and kidney diseases than dark meat is doubtless faulty. The tenderness of the meat depends on the species of animal, the age, the kind of feeding and the degree of muscle work done by the animal.

The greater tenderness and improved taste of the meat of the asexualized animal is caused by the interposition of finely divided fat in the muscles. The amount of blood contained in the meat is of essential importance for its nutritive value. The meat containing most blood is game. This high content of blood, of course, favors the rapid putrefaction of meat.

The only food cultured people eat in the living state is oysters, with the exception of the Japanese, who eat small fish in a living state. Lobsters, green turtles, crabs and shrimp should be boiled immediately after being killed. In this variety of animals the postmortem changes of protein, which give a certain special taste, are going on very rapidly. In fish the tendency to putrefaction is not so great, although only freshly killed material should be used. The meat of birds and mammals should be put in cold storage for a time before use. The lactic acid produced from the glycogen of the muscle substances softens the connective tissues, a process which favors digestion by the secretions of the stomach and intestines. This softening of the connective tissues, which is very important, can be accelerated by putting the meat in weak acids, as for example, vinegar.

THE DIGESTION AND ABSORPTION OF MEAT.

The stomach plays a most important part in the digestion of meat which is composed of two acts: first, the destruction and softening of the connective tissues, and second, the digestion of proteins. Whereas the latter is accomplished largely by the secretion of the pancreas, the first is an exclusive function of the pepsin and hydrochloric acid in the stomach. Therefore, in some diseases of the intestines and adjacent glands it is advisable to introduce the meat in a form which stays in the stomach a long time. On the other hand, in certain other diseases of the stomach just the opposite procedure is wiser. Table I gives a

picture of the length of time different types of meat stay in the stomach. (See Table I, Chapter IX, Penzoldt, p. 264.)

Another factor in gastric digestion must be considered, namely the degree in which the different kinds of meat, according to the species of the animal and according to the kind of cooking, increase the secretion of pepsin and hydrochloric acid. Boiled meat, fish, poultry and veal do not cause as much acid as fried or broiled meat, or meat boiled a short time, especially dark meat. High percentages of fat diminish the secretion of the stomach, while certain methods of preparation, as for example, smoking, spicing and preserving increase it sometimes to a considerable extent. The kind of meat and its preparation recommended in our diet depends upon the condition of the stomach. The most important methods of preparation of meat are frying, boiling, broiling and steaming.

It is not advisable to eat raw beef or raw sausages such as salami and frankfurters. The stomach is usually not able to kill the germs which live in the interior of these sausages and we can say that raw meat sausages are the most common cause of meat poisoning, especially infections of paratyphoid. In the most common ways of preparing meat, the meat loses fat, protein, extractive materials, salts and water in small quantities. The most important change is the softening of the connective tissues and the transforming them into a soluble substance. In frying meats, aromatic and palatable substances are formed, contained in the highest concentration in the crust of the fried meat.

In the proper method of boiling meat, the external portions of the meat have a temperature near 100° Centigrade. The red color of the meat changes at a temperature of 70° C. The temperature in the interior parts should not be increased higher, as this temperature is sufficient to soften and dissolve the tissues. The water used in boiling should

have dissolved in it 1 per cent. of cooking salts to prevent the diffusion of the salts of the meat. Another kind of boiling is cooking in steam and heating in paper cups, what the French chefs call "en papillote." In this kind of heating the meat boils in its own steam and, therefore, stays very juicy. For ordinary housekeeping purposes this method is too complicated and therefore cannot be employed. In frying, it is the dry heat which produces the typical changes of the meat and, consequently, the meat in this method of preparation remains much more juicy than when it is boiled. Besides the production of crust, roasting gives to the meat an agreeable taste and smell and without doubt increases the secretion of the stomach. Between these two methods is steaming, which should be done in a special pot under high pressure. In addition to these methods baking should be mentioned.

Besides the muscle, we must also consider the place in the diet of the liver, kidneys, brain, lungs and thymus (sweetbread). All these parts consist of tissue very rich in cells and, therefore, produce many purin bodies and, for that reason, they are forbidden in uric acid conditions and diseases of the kidney. The difficulty in digestion is due to their rich connective tissue. Of these glands and organs, the liver, especially of poultry and calves, is most commonly used in the kitchen, but we must consider that, from the point of view of nutrition, all livers contain a high amount of fat and they are consequently forbidden in cases of obesity.

Blood is used practically only for the manufacture of sausages and corresponds in its nutritive value to lean meat. We must bear in mind that it undergoes a rapid putrefaction, more so than any other kind of protein-containing foodstuffs.

SAUSAGES.

Sausages are manufactured from different parts of the same or different animals by adding salt and spices, the different portions eventually being combined by methods of baking in salt and smoking. For economical reasons not only meat is used but other parts of the animal as well, and the mass of the sausage consists of meat, fat, blood, liver, kidneys, spleen, heart, lungs and brain. Sausages are usually boiled after they are filled in the casings, after which they are smoked. Some are first smoked and then boiled. Some kinds of sausages are smoked but not boiled, as salami or saveloy sausage. The preserving of sausage depends upon the percentage of water, salt and particularly upon the degree of smoking. If blood and liver are mixed in, they will spoil more quickly. The following table (von Noorden-Salomon) gives a picture of the composition of different kinds of sausage:

	Water. Per cent.	Protein. Per cent.	Fat. Per cent.	Salt. Per cent.	Calories. 100 Gm.
Cervelat	24.2	23.9	45.9	6.0	525
Salami	17.0	27.8	48.4	6.7	564
Frankfurters	42.8	12.5	39.1	3.1	425
Pork sausage	46.9	12.9	34.4	3.3	382
Liver sausage	47.8	12.9	25.1	2.2	335
Blood sausage	39.3	12.5	44.5	1.9	465

Because of their spicy and agreeable taste we use sausages in the diet of the sick to increase the appetite and the state of nutrition, but only when stomach and intestines are in good condition. We forbid sausages in cases of hyperacidity of the stomach, in uric acid conditions and diseases of the liver, kidneys and skin.

PRESERVING OF MEAT.

In the last two centuries the technique of preserving meat has made considerable progress, but it certainly has not yet reached the highest degree of development. The purpose of preserving meat is not only to protect it against putrefaction but also to change the taste and to increase

the nutritive value. The simplest method of preservation of meat is drying, now employed only in the curing of certain kinds of fish.

Meat powder plays an important rôle in the composition of certain tonics. For a time, the most important mode of preservation was cold (ice box and refrigerating). In the latter the temperature is about 10 degrees below freezing and meat can be preserved for a very long time, but it must be borne in mind that if the meat is taken out, putrefaction begins very quickly. Meat can be kept in small ice boxes only about three days and fish not more than one day.

The important chemical methods for the preservation of meat are packing in salt, corning and smoking. These methods are so well known that it is not necessary to describe them in detail. We must mention that meat packed in salt is not suitable for people with kidney diseases or with stomach and intestinal trouble. The difficult digestibility of smoked meat is exaggerated. It is, however, true that when spoiled it is certainly harder to digest than any other kind of meat. The following table (von Noorden-Salomon) shows us the composition of the most important smoked meats and fish:

	Water. Per cent.	Protein. Per cent.	Fat. Per cent.	Calories. 100 Gm.
Corned beef	47.7	27.1	15.3	253
Smoked tongue ..	35.7	24.3	31.6	393
Smoked ham	28.1	24.7	36.4	440
Smoked goose breast	41.3	21.4	31.5	382
Herring	62.6	19.5	9.2	165
Sardines in oil	53.2	23.2	16.8	251
Smoked eel	53.0	16.6	26.7	315
Smoked sturgeon .	63.7	31.2	1.8	144
Smoked haddock ..	68.9	26.9	0.4	114

INJURIES TO HEALTH CAUSED BY MEAT.

First: Tapeworms and trichina; second: Infectious diseases of animals.

The most dangerous is the paratyphoid of cattle, the germ of which probably after the death of the animals migrates from the intestines into the meat and in that way infects the human. Diseases causing enteritis arise from an infection caused by the very common germ called *Bacillus enteritidis.* Dysenteric symptoms are caused by bacteria or other parasites (amebas). The danger of infection with tuberculosis germs is certainly very small if it really exists at all. Furthermore, all kinds of infectious germs can adhere to the meat of animals without essentially changing the taste and smell of the meat. There can also exist in the meat all degrees of putrefaction. A special kind of damage caused in meat is Botulism. The germ itself is not infectious for the human, but the by-products are among the most effective poisons known. It causes, like atropine, serious neuritic changes and paralysis of the heart. The common opinion that it is possible, by scientific methods, to state if the meat has undergone changes which may be injurious to the health, is erroneous. Meat that microscopically looks perfectly all right and in which we can detect no poison by any chemical method still may contain serious poisons. If we want to be sure about the good quality of meat we must eat only the meat of freshly killed animals. Sausages and every kind of preserved meat should be avoided, a precaution which, for the large part of the population, is difficult to carry out.

SOUPS.

The common opinion that the importance of soups in our diet lies in their nutritive value is incorrect. When we speak of their caloric value, if at all, we mean the caloric value of foodstuffs which we mix in the soups, as cereals, vegetables, fats, meats, etc. The value of clear soup in itself is very small so far as the direct nutritive value is

concerned. The qualities which make soup a valuable and irreplaceable food are the agreeable taste and smell, the stimulation of the appetite and the stimulation of the gastric secretion. Due to the appetizing and stimulating effect of broth on the gastric secretion, we use it in all cases of lack of appetite and in cases of a deficiency of secretion of the stomach. We forbid it in the case of individuals who suffer from increased acidity of the stomach. Broth has a slightly laxative influence upon the intestines, and therefore we must use it cautiously in inflammatory conditions of the intestines with diarrhea. In kidney diseases, too, broth is forbidden, or allowed in small quantities only, because of its high content of salt.

We should mention a foodstuff which, especially some time ago, played an important rôle in the diet and whose nutritive value was highly overestimated, namely, the so-called meat extract which was produced in very large quantities in South America (Liebig). The meat extract consists mainly of the so-called and above described extractive substances of the meat, salts of the meat and protein in unimportant quantities only. It is interesting to know that this meat extract was for a long time supposed to be of high nutritive value and to contain the highest nutritive elements of the meat. Before more exact chemical methods could prove its precise composition, experiments made on pigeons proved that meat extract has no direct nutritive value. A certain number of pigeons were given large quantities of meat extract. The pigeons that were fed with meat extract starved sooner than the pigeons that did not get any food. The reason for this is, that the meat extract contains in a high quantity the potassium salts of the meat which have some stimulating effect on the heart and on the circulation. The meat extract, however, has no direct nutritive value at all. But, if carefully prepared, it is of indirect value

for our nutrition as is soup or spices, and it is used mainly to improve the taste of fried meat and to make gravy.

FISH AND SEA FOOD.

The old prejudice that fish have an inferior nutritive value and are difficult to digest is false according to the more exact investigations of modern science. There are, of course, differences in the varieties of species of fish, but on the average we can say that, so far as digestion and nutritive value is concerned, the manner of preparation is more important than the kind of fish. In disease of the stomach and intestines we should exclude fish with much fat or connective tissue, as for example, the eel. On the whole, the meat of practically all fresh-water and salt-water fish is comparatively softer than the meat of mammals, and does not have to be stored.

On the other hand, the meat of fish undergoes putrefaction faster. This has to be borne in mind, especially in the case of fresh-water fish where the method of preservation in transportation is not as advanced as in the case of salt-water fish. In the diet of the sick we use the meat of fish just as often, and with just as good results, as the meat of mammals and poultry. This is especially true in gouty conditions and kidney diseases, where we prefer fish because of their small purin content. The difference in the nutritive value is very small as the following table shows:

PERCENTAGE IN 100 GRAM TABLE.

	Beef. Per cent.	Veal. Per cent.	Fish. Per cent.
Proteins	20.5	20	17.1
Fat	2.8	1	0.7
Salt	1.2	1.2	1.2
Calories	110	91	77

Fish poisonings are due either to the putrefaction of dead fish or to bacteria that adhere to them. In the tropics

there exist fish whose meat is poisonous to the human even in a fresh state. Furthermore, several varieties of fish have poisonous eggs during the spawning time.

Of the so-called shell fish, the best known are lobsters and crabs. Their meat is difficult to digest because the connective tissue is very strong; they are, therefore, to be avoided in weaknesses of the stomach and intestines. We forbid them also in diseases of the skin because they produce in certain people skin rashes. The reason that shellfish becomes red when cooked is due to the fact that the pigment consists of a red and blue portion, and the blue pigment is destroyed by heating.

Oysters play an important rôle in the nutrition of people living along the seashore. The appetizing taste, the easy digestibility, and the protein content are the most important qualities of oysters. The caloric value is of no importance. The usual way of eating oysters is in a raw or uncooked state, although the modern kitchen knows other ways of preparing them, as for example, stewing or frying in butter or bacon fat. Oysters with the green gills are supposed to be the best, the green color being due to their living on certain algæ. We must mention, however, that there is a certain danger in eating oysters, even when they are correctly and hygienically treated in the oyster beds. They can carry infectious germs if the oyster beds are in places close to the drainage from large cities.

The turtle should also be mentioned, from the meat of which are made appetizing soups of high nutritive value, greatly to be recommended in a diet for the sick. Under the name of mock turtle there is prepared a soup that contains, in the main, tissues of the head of the calf.

FISH EGGS.

Caviar is obtained from the eggs of different varieties of sturgeon, the salt percentage being between 2 and 8 per

cent. The so-called unsalted caviar does not exist at all; it is caviar with a minimum amount of salt. Caviar belongs to the best tasting and most suitable foodstuffs we know and we use it often in the diet of the sick. It is suitable in states of fever when other protein containing foodstuffs cannot be used. Then, too, caviar is valuable as a food in diseases of the stomach and intestines, in the transition from liquid to solid diet, and in all cases where we wish to increase the nutrition in people who have weak digestive organs.

CHEESE.

Cheese is the precipitated casein of the milk, which after different additions and various treatments is exposed to the process of fermentation. This process consists mainly in changes of the proteins and fats of the cheese. The high caloric value and the high protein content of cheese make it one of the most nutritive of foodstuffs and at the same time it has the advantage of being very cheap, since in no other form can we get so many calories and at the same time such valuable and easily digestible proteins. Although the nutritive value of cheese consists chiefly in its high percentage of protein there is no kind of cheese that does not contain fat in a considerable amount. This content of fat gives cheese its characteristic composition and taste and we class cheese according to its percentage of fat, as fat cheese, half-fat cheese and dry cheese. While for the normal healthy nutrition we recommend cheese at least once daily, this can be done in the invalid's diet only under certain restrictions. In the diet of those suffering from stomach and intestinal disorders we use soft cheese when we employ a more solid form of diet. In the high caloric diet we use cheese because of its great content of fat. Because it does not contain any carbohydrates it plays an important rôle in the diet of diabetes. We for-

bid cheese in conditions of obesity, in acute fever, and diseases of the skin.

MILK.

The nutritive value of milk is so high that the growing body of the infant with its high requirements in foodstuffs is satisfied by milk, without the addition of other food. It is interesting to know that in the first month of life the digestive ferments in the stomach and intestines are not yet developed. This fact shows us more than anything else can, how easily digestible milk is. The average milk contains 4 per cent. proteins, 3½ per cent. fat and 5 per cent. carbohydrates, in the form of milk sugar. Of the salts in milk, calcium, potassium and a very small quantity of iron predominate. The caloric value of milk is 700 calories to the quart. If an average adult were to cover his daily caloric requirements with milk, milk being the only food taken, it would be necessary for him to drink 3½ quarts of milk a day. In all cases in which we are obliged to give milk as the only foodstuff for an adult person, as in certain kinds of kidney diseases or stomach diseases, it is difficult to reach the daily quantity of 3½ quarts. We give, in these cases, rarely more than two quarts a day. This quantity of course is not sufficient for proper nourishment.

It is of great importance for the nutritive value of milk that it contain all the necessary foodstuffs (proteins, fats and carbohydrates), in the proportion in which they are suitable for the body. Of the calories that are introduced to the body in milk, 23 per cent. are in the form of proteins, 30 per cent. in the form of carbohydrates and 47 per cent. in the form of fats. We see from this that milk is a high protein-containing food. As the percentage of carbohydrates in milk is relatively small, milk plays a certain rôle in the treatment of diabetes. Since a part of the milk sugar is fermented in the intestines, in all cases in which we wish

to improve the state of nutrition, and in which we are obliged for any reason to use milk as the main food, we must introduce, besides milk, large quantities of carbohydrates.

The importance of milk in the diet of the sick lies in its easy digestibility; 200 c.c., which represents a value of 140 calories, leaves the normal stomach in one to two hours. The digestibility of milk is increased by boiling and by the addition of small quantities of fine flour. It must be mentioned that many individuals become constipated by an exclusive milk diet, but this fact is not so important, since the quantity of bacteria in the stools is so small and at the same time protein putrefaction in the milk diet is also very slight. In cases of catarrh of the intestines with diarrhea it is advisable to add a certain quantity of lime water to the milk. It is a fact that many people have a strong dislike for milk. In such cases we add certain stimulants or substances to the milk which change the taste, as tea, cocoa, and in some instances small amounts of cognac.

The curative effect of a milk diet, especially in diseases of the organs of secretion and kidneys, is explained first of all by the small content of sodium chloride in milk, while calcium and potassium salts are contained in a relatively high quantity. The potassium salts especially are responsible for the increasing effect which milk has on the urine production of the kidneys, a fact that makes us use milk in cases where we want to withdraw water from the tissues. Besides sweet milk, we use milk that has been changed in its taste and partly in its chemical composition by fermentation.

In this connection we should mention common buttermilk and the so-called zoölak. As far as the nutritive value is concerned this fermented milk does not differ very essentially from sweet milk, except that a part of the milk sugar is fermented. In the case of zoölak, a certain germ is pres-

ent which is supposed to have a highly antagonistic effect on the putrefaction of proteins in the large intestines, a fact that comes into consideration therapeutically, in cases in which this putrefaction of proteins produces constipation or diarrhea. We have mentioned elsewhere that the exclusive drinking of large quantities of buttermilk may have a harmful effect on the body.

MILK PRODUCTS.

When milk is centrifuged the fat parts of it go to the center and form the cream. This cream contains about 25 per cent. fat, 3 per cent. protein, but no longer any sugar. The fat is in a finely divided state and therefore easily digested and absorbed. If the cream is mechanically beaten, then we get fat in a compact mass called butter. Milk remaining after this process of butter production is used mostly in baking. Another important product of milk is cheese about which we have already spoken.

EGGS.

After milk, the most important foodstuff in the diet of the sick is eggs. The reasons for this importance are the high percentage of proteins, the relatively easy digestibility and the characteristically agreeable taste which gives the egg the rank of the most important appetizing hors d'oeuvre. Besides that, the egg has certain physical and chemical qualities which recommend it in the cooking of many dishes, as cakes, puddings, etc. The following table shows the composition of the egg.

AVERAGE 50-GRAM WEIGHT.

	Water.	Proteins.	Fats.	Salts.	Calories.
One egg ...	36.7	6.3	6.0	0.25	77

We see from this table that eggs are one of the highest protein-containing foods, surpassed only by meat and

cheese as a bearer of protein, although it would be hard to cover the requirements of protein by the use of eggs alone. Assuming that the average requirement of protein for an adult is 100 grams daily, it would take sixteen eggs a day to cover this requirement. The yolk of the egg differs from the white in its low content of water and its high content of fat. Of the 75 calories of an egg, 15 calories belong to the white and 60 calories to the yolk, this being due to the high fat percentage of the yolk. Besides that the yolk is rich in phosphates and iron, the latter being contained in the form of hematogen. This is the reason for the supposition that the yolk of the egg is a blood-building foodstuff.

In speaking of the digestibility of eggs we must first consider the different ways of preparing them. We eat eggs raw, soft-boiled and hard-boiled. It is a commonly known fact that the hard-boiled egg is less easily digestible, especially for people with gastric disturbances. One hard-boiled egg leaves the stomach in two to three hours, whereas a soft-boiled one takes from one to two hours. On the other hand, raw eggs stay from two to three hours in the stomach also. We should mention that eggs do not influence the secretion of hydrochloric acid in the stomach essentially, but are able to combine chemically a large quantity of acids and they therefore play an important rôle in the diet of ulcers of the stomach and in cases of increased acidity of the stomach. One reason that we cannot use eggs in the diet of many individuals in large quantities is the fact that they incline to putrefactive changes in the large intestines.

In the case of kidney diseases we can give eggs in a moderate amount, but only boiled eggs. The great importance of eggs in treating diabetes is based on the high content of protein and fat. The raw egg is rarely used as a whole egg, ordinarily the yolk alone being used in broth

or in milk. Otherwise eggs are eaten boiled, poached or in numerous preparations such as omelets. By boiling the yolk of the eggs in milk with the addition of sugar and different spices, we get different kinds of custards. Of greater importance than as a foodstuff by itself, we employ eggs as an auxiliary foodstuff in many preparations in the kitchen. If the white of the egg is beaten there is formed the so-called meringue. If this meringue is used in puddings it imparts to them a soft consistency which increases their digestibility.

FOODS WITH CARBOHYDRATES AS THE MAIN FOOD ELEMENT.

CEREALS.

In contrast to vegetables, cereals have a high content of nutritious elements, for the most part carbohydrates. The most important cereals are wheat, barley, oats, rye, corn and rice. The following table (von Noorden-Salomon) shows the exact composition of these cereals:

For 100 Gm.	Water. Per cent.	Proteins. Per cent.	Fats. Per Cent.	Carbo-hydrates. Per cent.	Salts. Per Cent.	Cellulose. Per cent.
Wheat	13.4	12.03	1.85	68.7	1.77	2.31
Barley	12.95	9.68	1.96	68.5	2.50	4.4
Oats	12.8	10.25	5.3	59.7	3.02	9.97
Rye	13.4	12.0	2.0	68.1	1.93	1.7
Corn	13.3	9.4	4.5	69.4	1.4	2.3
Rice	13.17	8.13	1.29	75.5	1.03	0.88

All the cereals contain a considerable amount of cellulose, and therefore they are prepared by the application of intensive heat. Beside their high content of carbohydrates, they also contain a high quantity of proteins, namely between 8 and 12 per cent. Accordingly it is sufficient in a diet which is very rich in cereals to add only small quantities of protein in order to arrive at a diet with a satisfactory protein content. The quantity of fat in cereals

is very small; even corn which is the richest has 4.5 per cent. fat only. The importance of cereals in our nutrition lies in their high content of carbohydrates. In rice this is about 76 per cent.

BREAD.

Of all the foodstuffs which are prepared from cereals the most important is bread. The many methods of preparing bread differ according to the variety of flour used, or according to the mixture and the method of baking. There is a wide variance in individual preferences for the different types of bread. Wheat and rye are the most popular. Wheat bread has a higher nutritive value and is more easily digestible. We must bear in mind, however, that the finest kind of wheat bread is prepared from flours which have had the kernels removed and, in consequence, lack to a large extent the vitamins which are essential in proper nutrition. The degree of milling out the fine part is usually not as great in rye as in wheat. Further, many people prefer rye bread because of its more spicy taste. The breads of finely milled-out flour have almost no mechanically irritating effect on the mucous membrane of the intestines and, therefore, lead to constipation.

For this reason there are a number of breads on the market which have had added a considerable amount of the lower product of milling, as bran and coarse meal. They then play an important rôle in the diet of the sick, especially in constipation and diabetes. They are beneficial in the latter disease because they are rich in proteins and poor in carbohydrates. The following table shows the composition of the most common kinds of bread:

	Water. Per cent.	Proteins. Per cent.	Fats. Per cent.	Carbohydrates. Per cent.	Calories. 100 Gm.
Wheat bread	33.7	6.8	0.5	57.8	270
Rye bread	40.0	6.4	1.1	50.4	243
Corn bread	40.4	5.8	2.0	45.7	227

The daily consumption of bread by an average adult varies greatly. More than one-half of the requirements in calories of the average working man is furnished by bread (600 to 700 grams daily), but even people who perform no hard muscular work should consume a daily quantity of at least 300 grams (male) and 250 grams (female). Unfortunately, among the well-to-do bread is greatly decreasing on account of the variety of other foods, a fact which is of considerable nutritional importance. As far as the influence of the bread on the stomach is concerned we know that white wheat bread stimulates the acid production in the stomach only slightly, whereas with rye bread and toasted bread acid production is much higher. People suffering with diseases of the upper part of the small intestine are particularly prone to hyperacidity. We recommend in these cases, therefore, only the finest wheat bread, excluding the crusts.

In disorders of the large intestine, especially in cases in which there is an inclination to constipation, we recommend rye bread or, even better, bran bread. In kidney diseases we prefer the finest wheat bread prepared without salt. In cases of obesity, the quantity of bread consumed is most important. In those cases, too, we prefer bran bread. In diabetes the quantity and quality of the bread can be ordered by the attending physician from day to day, according to the amount of sugar found in the urine.

VEGETABLES.

The nutritive value of meat, eggs, and milk is based mainly on the content of protein and fat, while the foodstuffs of vegetable origin contain mainly carbohydrates and but very little fat. In some of them, however, the content of protein is not unimportant, for example the legumes. All the nutritive substance of vegetables is in the cellulose coverings. This cellulose substance is not digestible

by the ferments of our intestines and, therefore, in all foodstuffs of vegetable origin cooking is much more important than in foodstuffs of animal origin, and there are only a few of them we eat in a raw state. We differentiate three great groups of foodstuffs of vegetable origin, namely, the vegetables including potatoes and legumes, the cereals and the fruits. All vegetables contain a high percentage of water, the average being about 90 per cent., and, therefore, their nutritive value becomes considerable only if we consume large quantities of them. The content of fat is very small and, with some exceptions, they are all poor in protein—such an exception is the mushroom family which is rich in proteins. Starch, dextrine and sugar are the main carbohydrates contained in vegetables. All vegetables contain a high amount of salts with potassium and magnesium salts prevailing. In addition they contain a considerable amount of iron and calcium salts. Spinach contains about 3.4 per cent. iron in the ash, lettuce about 5.3 per cent. iron.

The great importance of vegetables in our nutrition lies not in their caloric value but in their content of cellulose and their pleasant taste. As the vegetables contain a high percentage of cellulose which is indigestible for the human intestines, they are usually not eaten in a raw state. However, vegetables which are eaten in a raw state have added to them certain acids, thereby forming salads. The most common form of preparing vegetables is to cook them in boiling water. To the boiling water we usually add a certain quantity of salt which increases the boiling point and, in consequence, the amount of softening of the vegetables. In order to make boiled vegetables more palatable they are often served with a sauce composed of butter, flour, water or milk.

This method of preparation increases considerably the nutritive and caloric value of the vegetables, which is a

very low one in the vegetables simply boiled. The purées of vegetables are of the highest importance in the diet of the sick. Spinach, carrots and potatoes are mostly prepared in this way. Since vegetables combine a large volume with a relatively small nutritive value we give them in large quantities in the diet for reducing, as it fills up the stomach and in that way gives the patient the feeling of being satisfied. The reason for eating vegetables together with meat is to soften the meat in the stomach, and this is done by interposing particles of the vegetables, like foreign bits between the particles of the meat. In all cases of a diseased stomach, whether it be catarrhal conditions or ulcerations, the purée is the only form in which we administer vegetables.

The importance of vegetables for the large intestines consists in their ability to increase the peristaltic movement, this being due to their high content of cellulose. This stimulating effect is partly mechanical irritation of the walls of the intestines and partly the irritation produced by chemical changes of different bacteria. Vegetables play the most important rôle in the diet of diabetes. This is not only because of their large volume, but more so because we can introduce with vegetables considerable amounts of fat in a palatable form. The legumes have, as above mentioned, a high percentage of protein and therefore we use them in all cases where for any reason we cannot give meat, since the legumes are able to replace to some degree proteins of animal origin.

POTATOES.

One of the most important foodstuffs of vegetable origin is the potato. Potatoes differ from other vegetables greatly, in that they contain a high amount of carbohydrates which gives them a considerable nutritive value. Potatoes were first found in America and were taken

at the end of the sixteenth century to Europe. Several centuries passed before potatoes began to take the important rôle in our nutrition which they now play. They are mainly, in fact exclusively, carbohydrate-containing foodstuff, the carbohydrate being in the form of starch with only a small proportion (less than 1 per cent.) in the form of sugar. Fat is contained in a small quantity only, while the average percentage of proteins is about 2 per cent. The mineral salts are mainly potassium and phosphates. However, potatoes are poor in calcium and sodium chloride. For this reason we add a large quantity of cooking salt to potatoes in our diet. The following table gives the percentages in the average composition of potatoes:

	Per cent.
Proteins	1.7
Fats	0.2
Carbohydrates	20.0
Cooking salt	0.06
Water	75.0

Calories for 100 grams = 88.

We can call potatoes an easily digested food, especially when they are prepared in the form of potato soup or mashed potatoes. The latter dish plays an important rôle in the diet of stomach diseases and in inflammatory conditions of the intestines. If potatoes are well prepared and cut into small pieces they then leave the stomach very quickly and stimulate to a slight degree the production of acid in the stomach. The absorption of potatoes in the intestines is, in the main, excellent. In the diet of the sick, potatoes are very important, especially in the treatment of obesity, in diabetes, in constipation, in kidney and stomach diseases. As far as obesity is concerned we must bear in mind that potatoes have a great volume compared to their caloric value, and they therefore favor the feeling of being satisfied. In stomach diseases we employ mashed potatoes especially. By adding milk, cream, butter or egg yolk we

can increase considerably their nutritive value. In catarrhs of the intestines, especially during and after diarrhea, mashed potatoes are preferred to other mashed vegetables. Mashed potatoes are given even in cases of typhoid fever.

As above mentioned, potatoes in a pure state are valuable in a diet of obesity; and not only that, but they also play a certain rôle in feeding up the undernourished. In the latter case they are used, not so much for their own nutritive value, but because they are a food which can be prepared with much fat, and which takes up this fat in such a way that the taste is well disguised. With a quantity of 150 grams of potatoes we can easily take about 40 grams of butter without being unpleasantly conscious of the fatty taste. This is the reason also for using potatoes in the diabetic diet.

FRUITS.

Like vegetables, fruits are very rich in water and cellulose. We eat fruits more than we do vegetables in a raw state, chiefly because of their characteristically agreeable taste and their high content of sugar and organic acids. The sugars contained in fruit are mostly dextrose and levulose. The content of organic acids varies from 1 to 2 per cent. Lemons are exceptionally high in acids with about 5.4 per cent. acid content. The percentage of water is from 80 to 85 per cent. The content of protein or fat is negligible. We eat most of the fruits of our diet in a raw state. In addition many fruits are stewed or preserved with sugar, the so-called compotes, jellies and jams. Raw fruits do not belong to the easily digested foodstuffs. For instance, 150 grams of cherries do not leave the stomach until the expiration of from two to three hours, and the same quantity of apples not until three to four hours later. For this reason, and because of the irritating effect on the mucous membrane of the intestines, we do not give fruit in

a raw state in conditions of catarrh of the intestines or diarrhea.

Because they contain a certain amount of cellulose, sugar and organic acids, fruits have a certain laxative effect. We, therefore, give them in large quantities in a raw state in constipation. Fruits have this laxative effect most markedly if they are taken without any other foodstuff, say for example, at breakfast, or at a time when the stomach is perfectly empty. Formerly fruit diets played a more important rôle than they do today. For example, grapes are quite commonly employed in the treatment of pulmonary tuberculosis with the idea of increasing the state of nourishment of the body. Wild strawberries have been recommended in gouty conditions and in some skin diseases also if they do not produce urticaria. In diabetes we choose the fruits which are poor in sugar, as apples and oranges.

SUGAR.

By sugar we mean the most common sugars used in the kitchen for sweetening foodstuffs, as cakes, puddings, preserved fruits, and cocoa; namely, cane sugar and beet sugar. Lactose (milk sugar), dextrose and levulose, contained in fruit and honey, and malt sugar, contained mainly in beer, are all of much less importance. Before cane and beet sugar were known and in common use, the most important sugar was honey, which contains from 70 to 80 per cent. sugar and which even in our modern diet has a certain degree of importance, first of all because it contains large quantities of the above mentioned vitamins and second, because it has an agreeable taste. In a pure state, especially, it is to be preferred for children to any other kind of sugar. Sugar in moderate quantities must be considered as a foodstuff of high nutritive value, the consumption of which is increasing continually in all civilized populations. Sugar in a large quantity and in a high concentra-

tion, however, has an irritating effect on the mucous membrane of the stomach and small intestine, and can in this form cause catarrhal inflammation, lack of appetite and even diarrhea.

TABLE FOR SUGAR.

	Per cent.
Candies	85 to 95
Honey	78
Fruit syrups	65 to 75
Jams	60 to 70
Chocolates	55 to 60
Raisins	55 to 60
Marmalade	55 to 75
Figs, dates	45 to 55
Ice cream	40 to 55
Stewed prunes, apples	35 to 50
Honey cakes	25 to 40
Cakes, puddings	20 to 30
Candied fruits	40 to 50
Grapes	14 to 20
Fruits (apples, pears, cherries, apricots)	8 to 15

It is a well-known fact that sugar taken before meals decreases the appetite. We should, therefore, eat all sweet tasting food at the end of the meal only. Sugar entering a full stomach is diluted to such an extent that it cannot cause any of the above-mentioned disorders. It is hard to say what daily quantity of sugar is most suitable for the body, probably a daily quantity of about 200 grams. As sugar has a high caloric value (400 calories to 100 grams) 200 grams would cover almost one-fourth of the average requirement of calories for the body. In addition we must remember that sugar is very easily absorbed and throws almost no work on our digestive organs. However, if sugar is to be advantageous for the nutrition a large quantity should not be taken at once, nor should it be given in a concentrated form. If a large quantity of sugar is given at one time (more than 150 grams at once) then the sugar content of the blood rises above the so-called threshold

and sugar appears in the urine. The most important contra-indication in the use of sugar is, of course, diabetes. We avoid sugar in stomach diseases, especially in the cases where there is a lack of acid secretion, because sugar tends to decrease the production of acid in the stomach. The table (see p. 64) shows the percentage of sugar in different foodstuffs.

FOODS WITH FAT THE MAIN CONSTITUENT.

BUTTER.

Butter is fat which is separated from milk by mechanical treatment and contains even then about 15 per cent. of milk. According to the kind of milk from which it is produced, we differentiate between sweet milk butter and sour milk butter. The sour milk butter is usually salted to contain from 1 to 3 per cent. salt. According to the various times of the year butter has different natural colors. Therefore, it is permissible to add a harmless color, for the most part saffron and extract of carrots. Butter contains water in a state of fine division. This fact gives butter a distinct position among the other fats. The cold of evaporation prevents the overheating of butter, but this is true only if the heating does not last a very long time.

Besides fat there are only small traces of other substances contained in butter, and butter, therefore, resembling the oils in the unity of weight and volume has very high caloric value. Of all the fats employed in our diet, without any doubt, experience gives to butter the first place. Its digestibility and absorbability are perfect and possibilities of making use of it in a diet are without limit. Butter is the only fat that we can give to the sick in a raw state in large quantities (except the medical use of codliver oil).

Of the other fats that are used in the kitchen, those of vegetable origin, also margarine, lard and bacon should be mentioned. The most important fat of vegetable origin is olive oil. It is a very fine oil and is used mainly in the preparation of salads, mayonnaise and, if of first class quality, it has the same digestibility and the same nutritive value as butter.

From the shell of the cocoanut and from the seed shells of the oil palm fats are prepared, which are put on the market under different trade names, and which in their appearance, in their agreeable taste and in their digestibility are first-class. We can recommend the use of them very widely, especially since their cost, compared with butter, is low.

Under margarine, we understand those products whose fat is not exclusively butter fat. They are manufactured from the kidney fat of the ox, to which by the addition of other fats (partly butter) and etheric oils a butter-like taste is given. From a hygienic and dietetic point of view we can say nothing against them if they are prepared of first-class products, as even a refined taste cannot distinguish them from the best butter. In the diet of the sick it is best not to use them at all.

Lard is made from the fat of the kidneys and of the mesentery of the pig. It should be regarded as a first-class fat. It is best not to use it in the diet of the sick as sensitive organs of digestion do not tolerate it. In the diet of the healthy it is mostly employed in frying of meat and baking of cakes and puddings. In the preparation of certain foods, many people prefer it to any other fat.

The goose fat, which is so much used in the Jewish ritual kitchen, has a very low melting point and an irritating effect on the mucous membrane of the stomach. We forbid it, therefore, in cases of increased acidity of the stomach.

Bacon is the subcutaneous fat, especially of the hind quarters of the pig and it is cut in flat slices and packed in salt, or salted and smoked. In some kinds of bacon thin layers of meat are included. If eaten in a raw state it requires strong organs to digest it. It is much more readily digestible if cooked.

CHAPTER IV.

CONTAMINATION OF FOOD.

PARASITES, ADULTERATIONS AND ADMIXTURES.

1. **Parasites.**—The commonest animal parasites are the *Tænia saginata* of beef, the *Tænia solium* of pork and the larva of trichina in pork. Meat infection with *Tænia saginata* and with *Trichina* is nowadays very rare. The embryos of *Bothriocephalus latus,* the commonest parasites of fish, are destroyed at 75° C. in most varieties of fish.

2. **Infectious Diseases of Animals.**—A great deal of poisoning through meat is due to eating meat of infected animals, diseased before slaughter. Many bacteria are pathogenic for both man and animals. The meat of animals infected with anthrax produce the same infection in men; the same is true of paratyphoid fever of oxen. Other infections are tuberculosis, actinomycosis and septic pyemic diseases. Other diseases of animals are not transferable to men.

3. **Infections by Pathogenic Germs.** — Even though animals are not systemically diseased with pathogenic germs they still can be covered with such germs, as for instance oysters, which carry the bacteria of infected water, ultimately taking them into their intestinal tract and preserving them there. The infection of typhoid and paratyphoid as well as of tuberculosis may also be thus carried, as the intestinal tract of fish is very close to the part that is eaten, and the wandering of bacteria from the intestines to the muscles, very frequently happens if the intestines are not removed immediately after death. With animals and birds where the viscera are easily extracted right after killing, infection is less prevalent. Other dangers of in-

fection of fish are through transportation or contaminated ice. Meat may become infected through uncleanliness in slaughter houses and kitchens and through germs on hands and tools of working people. Most easily contaminated are sausages, especially when eaten raw, steaks and the so-called Hamburger steak. Virulent germs of infection may be present in meat even when its appearance, taste and smell are absolutely normal.

4. **Saprophytic Processes.**—Decay of meat which is due to germs of decomposition, as mildew, is evident from the taste and smell. The saprophytic processes occurring in meat due to maggots and mites seldom escape our attention. Of especial importance is botulism. The changes of taste and appearance are very slight and not of such a degree as to be offensive. The bacillus of botulism develops a poison which acts like atropin and produces very severe neuritic processes or paralysis. The most common poisoning is through sausage, ham or preserved meats. The poison develops only where air is excluded. Heat at 70° C. kills the bacillus but does not destroy the poison. In this group also belong such poisons as are not produced by infectious saprophytes but still when ingested produce disease. The process of decomposition through long hanging of game and birds is of an autolytic (self-dissolving) nature and not toxic.

5. **Poisonous Animals.**—Some fish and oysters without being diseased can be poisonous in certain seasons. It is probably due to some infcctious disease which the species have at that time.

6. **Broth and Meat Extracts.**—Meat extract may be poisonous due to the great amount of potassium salts (experimentally proved on the rabbit). In men, dogs and cats such bad effects have not been experienced. Broth and meat extracts have a certain stimulating effect on the heart and nervous system and also on the activity of muscles.

IMPURE MILK.

1. **Poisons.**—Poisonous substances which circulate in the blood can also pass into the milk, so that great care must be taken in the administration of drugs during nursing. Of importance are poisons which animals take through feeding on poisonous plants, such as meadow saffron, which although not injurious to animals themselves makes their milk poisonous, producing in children the so-called cholera, a disease of which diarrhea is the chief symptom. Poisoning through milk may also occur from the deadly nightshade (atropin), Christmas rose (veratrin), hogsbin (hyoscyamin), thornapple (atropin and hyoscyamin). These substances appearing in animals' milk are the cause of a considerable amount of sickness.

2. **Infections of Milk with Bacteria.**—The milk of healthy cows is free of bacteria inside of the udder, but bacteria present on the surface of the udder can readily be washed off into the milk, for this reason the first drawn milk should not be used. The bacteria content of the milk may be increased through lack of cleanliness and by dirty milk cans. Through aseptic milking the bacteria content can be reduced (from 80 to 90 bacteria per cubic centimeter to 10 per cubic centimeter). Not the number of germs but the species is of importance. For example, the species producing milk fermentation is harmless (sour milk—buttermilk).

The following milk defects are due to germs which mix with the milk during or after milking: Sour milk (*B. lactis*); blue milk, a state occurring within 18 to 36 hours after milking, due to *B. cyanogenus,* in dirty stables, especially in spring and summer; red milk (*B. lactis erythrogenes*); yellow milk (*B. synxanthus*), appearing in boiled or curdled milk and changing it into a brown, yellow-like, watery liquid; soapy milk, a condition where the milk does not coagulate and the taste is changed, the bacillus getting into

it from hay or straw. Bitter milk, due to the food taken by the cow. (Hay and potato bacillus may bring about this bitterness through protein decomposition.) Slimy milk is caused by several bacteria, a condition where the milk is of a slimy constituency.

All the above mentioned saphrophytes adulterate the milk and give it a nasty appearance, while they may cause intestinal disturbances in some sensitive children (especially bitter milk). Several pathogenic bacteria are to be found in milk. The well-known milk epidemics of typhoid, paratyphoid and cholera have been due to infections of the milk in the cans, or adulterations with dirt or from the hands of the attendants.

3. **Diseases of the Milk-giving Animals.**

(a) *Tuberculosis* is the most frequent disease. The real difference between the tubercle bacillus of the cow and man has not yet been completely clarified, so the tubercular animal must be regarded as a source of danger for man. We distinguish: (1) Tubercular diseases of the udder where the milk contains an enormous number of bacilli. This milk is not fit for human consumption and should be boiled even if given to animals. (2) General tuberculosis without the symptoms of the diseased udder, where the tubercle bacilli circulate in the blood and can pass through the milk even though the number be very small. Such milk is still being sold and should certainly be prohibited as a milk for children. When such animals give a positive tubercular reaction, without clinical symptoms of tuberculosis their milk should not be used and they should not be used for breeding. The safest way to prevent infections is by boiling the milk.

(b) *Flaps—Foot and Mouth Disease.*—The milk of such animals is very dangerous and is excluded by law from the market. The milk will produce many diseases in man similar to the animal infections. By boiling, the germs are

killed, but a certain toxic effect may remain which will produce intestinal disturbances in sensitive gastrointestinal tracts. In addition to the diseases already mentioned:

(c) *Anthrax.*—Milk from animals infected by septic pyemic processes and cow pest is excluded from the market.

(d) *Gastrointestinal Catarrh* without fever in animals should always cause suspicion of paratyphoid fever.

EXAMINATION OF MILK.

Admixtures and their Detection.—Good milk should have a pure white color with a very slight tinge of yellow, never blue, with the normal milk odor and sweet taste. A drop of milk on the nail should adhere to it and if dropped into water it should sink. Very important, especially for children and sick people, is the degree of acidity in milk. The best test is the alcohol test; equal parts of milk and 68 per cent. alcohol should not coagulate. The most frequent adulterations are water, mixing milk with thin milk, or combining both these processes, or by the addition of prohibited preserving matters, or flour, sugar or coloring materials. Watering milk reduces its specific gravity; skimming also by taking away the fat. Both of these methods combined are the most common form of adulteration.

CONTAMINATION OF BUTTER.

The normal germs contained in butter (ten to twenty million germs have been found in 1 cubic centimeter) are harmless. The predominating organism is the inoffensive lactic acid bacillus, which is found in buttermilk between the fat globules. Salted butter has fewer germs. There are, however, harmful germs to be found at times in butter just as there are in milk, and it is the duty of milk establishments to prevent infection of the cream by pasteurization and sterilization, and also by employing absolutely clean water for washing the butter. Real bacteria-free

butter is a great rarity. Any butter will become rancid if kept long in a temperature which is above freezing point. In rancid butter we find aldehydes and oxyfatty acids. The cause may be fermentative or bacterial processes. The rancid butter can be made useful by melting it, although it should not be used in any food intended for the sick. Butter becomes cheesy through oxidation of the fatty acids, this process being hastened by sunlight. White spots and stripes appear in the butter which are of harder consistency than the rest. Mildew starts always from the surface. If very slight the deeper parts of the butter can be used, but if excessive and deep the butter must be discarded. All the pathogenic germs which can be found in milk may pass into butter. The sterilization of cream, the washing and thorough cleansing of the bottles and machines with sterile water is the best protection. The germs of tuberculosis are seldom found in the butter of big milk establishments, but more often in the butter sold by small concerns. From a practical point of view the presence of typhoid and cholera germs transmitted through water or unclean hands are of more importance. In regions where there is danger of having water infected by typhoid or cholera only imported butter in original packages should be used.

CONTAMINATION OF CHEESE.

Swelling of cheese is due to abnormal gas production from false fermentation. Abnormal coloring: Some cheeses are intentionally colored with harmless colors, others contain pigment producing fungus vegetation, mostly green or gray; the green being intentionally produced by adding green herbs. Other pigment-producing fungus vegetation is not desirable and is to be considered as harmful to the cheese. These fungi develop over the entire surface of the cheese; the red, green or blue are harmless, but by spread-

ing deeper they make the cheese unpalatable. Some of the colors are due to metals. Iron compounds are harmless but those of copper (very common in Italy) are quite poisonous. The dark black color of cheese is due to the dark brown mildew fungus or to lead compounds, both being entirely harmless. The cheese fly and the room fly lay their eggs in cheese which develop into maggots. The cheese mite may be avoided in cheese cellars by the use of formalin or chlorine steam. The cheese mite is very often found in Stilton and Roquefort cheese. The germs which are pathogenic for milk and cream can also be found in fresh cheese; they are destroyed when the cheese is ripe with the exception of paratyphoid germs. Occasionally cheese poisoning is due to alkaloids formed through bacteria and found in older cheese.

SPOILED BREAD.

1. **Sour bread** is due to the addition of too much or too sour yeast to flour, most commonly rye flour.

2. **Stripy bread** is due to the fact that the dough was not kneaded enough or the flour has been kept in damp places (flour has hygroscopic qualities), or because the wheat was ground after it had started to seed. Damp flour if mixed with dry can be used in bread. Germs of mildew which are generally contained in damp flour will be destroyed during baking.

3. **Sticky bread** is due to the potato bacillus. The spores of these germs are resistant to the heat of baking and if other fungi, especially mildew, are present, the whole bread is rendered harmful and poison-producing.

4. **Red bread** is due to infection of the bread with a certain germ which does not produce any poison but makes the bread disgusting looking, and gives it an unpleasant odor.

5. **Adulterations by other grain mixed in with the wheat** are unavoidable. Most of these are harmless and do not alter the taste or appearance of the bread. Very unpleasant is the adulteration of mice dirt, insects and worms which can appear in the flour if it is not covered up. Such flour should not be used. Spurred rye which is found with rye, but seldom with wheat, is the most dangerous adulteration, producing poison on a large scale. Adulterated bread may have been the cause of amenorrhea (lack of menstruation) noted during the years of the recent war.

Corn infected with certain bacteria and mildew fungi will cause pellagra although sometimes this disease is due to lack of vitamins and not to poisonous substances in the corn.

6. **Pathogenic Germs.**—In the process of bringing the wheat from the fields to the mouth, there are thousands of possibilities, especially during the preparation of the bread, to have it infected with all kinds of germs. One of the most important organisms is that of actinomyces. In the barns the raw materials sometimes are touched by all manner of animals and insects who deposit their excreta; pest, cholera, dysentery and anthrax can be transmitted thus. There is also the possibility of contamination of the dough by water and milk containing pathogenic organisms. When the bread is baked there is still the possibility of infection from the baker to the consumer. Of late, breads have been sold in paper bags, and the baking of raw dough is accomplished in prepared paper bags also.

CHAPTER V.

THE VARIOUS DIETS.

1. DIET OF THE HEALTHY.

Before going into the details of the various diets suitable for the different physiological and pathological conditions it is advisable to take up briefly the normal diet of the healthy individual, in short, a description of the hygiene of eating and drinking.

Dietetic treatment was originally given serious consideration only in diseases of the gastrointestinal tract. Fasting, as the most extreme form of dietetic regulation, was employed in different metabolic disturbances, such as diabetes and also in dietetic measures aimed at the reduction of body fat. In this category belong also all other diets in which the foods are limited; the diabetic diet in which the carbohydrates are replaced by fats; the diet used in biliary obstruction where fats are replaced by carbohydrates; the diet employed in kidney diseases with the nitrogen-free foods in excess; the low-salt diet; the milk and vegetarian diet.

In a great many diseases, especially in diseases of the gastrointestinal tract the careful special diet is not the final aim of our treatment. A gradual adjustment to a more normal diet follows the strict diet used in the acute conditions.

The formerly diseased organs will incline to relapses, and only by getting patients accustomed to a steadily enlarged diet can we increase their resistance and obviate the dangers of recurrence of the same trouble.

DISTRIBUTION OF THE MEALS.

Theoretically, it should be possible to arrange a meal schedule most suitable for the human beings; practically, only by taking into consideration the customs and type of work people do in different countries can an arrangement of meals, best suited to the individual from the nutritive standpoint, be hit upon. For example, in every country the working man is an important factor and meal arrangements must necessarily be closely dependent upon his working hours. Generally three meals are entirely sufficient. In Central Europe breakfast is a very light meal with the main meal in the middle of the day, between twelve and one, dinner at night again being very simple. This arrangement was poor and was more suitable in the past. Breakfast should be richer as was formerly the custom in Central Europe. It is inadvisable to start the day with a small meal hastily eaten. The usual breakfast of milk, or coffee and milk, tea or cocoa with 50 or 100 grams of bread and butter and honey or marmalade is not sufficient. This often necessitates a second breakfast. In Northern European countries, in England and the United States, it is customary to add to the breakfast hot or cold meat or fish dishes, besides bacon, eggs, cereals and fruits. The use of fruits raw or stewed (especially baked apples) is to be recommended. Cereals and fruits help to activate the intestines.

The work should not begin for one hour after breakfast. After such a nutritious breakfast, work for four or five hours is easily performed. Too much meat, however, should not be used as this leads to uric acid formation and its retention in the system.

A second breakfast is not needed after a complete breakfast, except for children and young people, where a second breakfast of milk or raw fruit is sometimes advisable.

Luncheon.—Luncheon should be light as the time for it is short; 100 to 150 grams of meat with vegetables, bread, butter, cheese and fruit constitute a satisfactory luncheon. Potatoes, noodles, macaroni, or a thick soup made of cereals is advised instead of meat. It is not the number of dishes served, but the quantity of food eaten which is important. Making the luncheon a small meal is only possible if we adhere to the heavier breakfast described above.

Afternoon Tea.—Afternoon tea has lost its importance nowadays because working hours are longer than they used to be. Five o'clock tea with the cakes and other sweets served, only tends to add unnecessarily to one's weight and produce gastrointestinal disturbances. It is an unnecessary habit, unless it is employed to quench the thirst in hot weather, tea, fruit juices or a glass of milk being used.

Dinner.—Dinner should be served between seven and eight. Discussion of the menu is unnecessary as it differs in every country and every home. Dinner should be the richest meal of the day. The caloric value of the day's food intake should be divided as follows: breakfast, 35 per cent., luncheon, 25 per cent. and dinner, 40 per cent.

ARRANGEMENT OF MEALS FOR THE SICK.

In addition to a selection of the right food suitably prepared, punctuality and regularity of meals are of great importance. In severe cases it is the duty of the physician to stop the irregular and frequent feeding, which is often given with the mistaken good intention of adding more food. Generally it has the contrary effect, since the stomach loaded every half hour with food never reaches normal secretory activity. Very often a poor appetite follows. The time between meals should never be less than two hours.

MASTICATION AND SLOW EATING.

Slow eating and proper mastication are always to be recommended for the suitable digestion of a meal. The stomach and intestines are really only chemical machines for the fine division of food. The mechanical work is very small. Food has to reach these organs so the chemical power can act easily. The digestible portions of the foods must be acted upon by acids, alkalies and enzymes. This is possible only if the particles of food are sufficiently small to allow of their impregnation with digestive juices. If this is not the case, substances which should have been digested higher up will then reach lower parts of the gastro-intestinal tract. If, for instance, hydrochloric acid and pepsin do not reach the innermost parts of smoked meat pieces, undigested food particles are carried on into the lower intestines where there are no adequate ferments for further digestion. Coarse vegetables also will prevent the starch being acted upon by the ferments of the small intestines and a very fermentative material is produced in the lower bowel, causing dyspepsia. With raw foods small division is often more important than is the case with boiled ones. To the teeth is given the task of dividing the food. It is the most important factor for digestion in the mouth. Carbohydrate ferments only are found in the mouth. The main division of food, of course, occurs during its preparation in the kitchen, but good mastication, including slow eating and swallowing, is of the greatest importance.

THE DISTRIBUTION OF LIQUIDS.

How much fluid should be drunk with each meal and in what form is it best taken? This depends largely on the environment. For example, if the temperature is moderate and work not too hard, there is little need for liquids in the first half of the day. The normal liquid amount taken with

breakfast (250 to 500 cubic centimeters of coffee, milk or tea) is sufficient for most people until noon, especially if additional liquid in the form of fruits is taken. It is distinctly advisable to drink one glass of water (200 to 250 cubic centimeters) before breakfast. It stimulates the action of the bowels. In watering places the drinking of mineral waters in the early morning hours constitutes the main feature of the cure. The good effect of the habit being shown by the increased activity of the bowels. From these watering places patients carry away the habit of drinking water in the morning and keep it up indefinitely afterwards. Healthy people should use plain drinking water. In diseased conditions we can add acids, alkalies, sugar, milk, sugar water and mineral salts according to the individual case. Laving the stomach the first thing in the morning seems to increase the appetite for breakfast.

At noon the liquid requirement of most patients is very small. Habit, more than a real desire, prompts one to take water, and it is easy to become accustomed to going without it. Liquid taken with food has a different effect in different cases. In rare cases, water dilutes the acid content of the stomach. In a stomach with good motility, however, it leaves very quickly, and if one-half hour after a meal we test the stomach content the acid percentage will be the same whether water was added to the meal or not. On the contrary, a very large amount of water with the food will decrease the appetite of some people and provoke a feeling of heaviness in the stomach. This is true especially in cases of stomachs with decreased tonus. Again there are people who cannot eat solid or, in particular, fatty dishes without drinking.

Practical experience with patients and people shows us in which cases drinking with meals should be allowed and in which restricted. Often we are forced to reduce the liquid intake and sometimes we even have to prohibit

soups, but very seldom are there cases where we must advise the taking of additional liquids with meals. Even though alcoholic beverages in small amounts may not be harmful, luncheon is certainly not the time most suitable for them. Alcoholic beverages taken in the middle of the day produce a tired feeling and lessen the capacity for work. Water, mineral table waters, fruit juices, ices, a cup of coffee, or one or two cups of weak tea, are much preferable as drinks, with or after luncheon. The caffeine in coffee or tea increases muscular and nervous energy, but its employment is not advisable for every one.

A real need for liquids appears in the afternoon hours. This need arises certainly more from the type of the previous meals (the amount of liquid, the amount of solids, spices and the protein percentage) than from any external conditions such as the dehydration by sweating.

It is very hard for people who are on a reduced quantity of liquids to endure the thirst which arises, so a pleasant and refreshing drink between noon and dinner time is very advisable, especially in men who have no opportunity during the day to take liquids in any form. It is also advisable in the afternoon between five and six to take one-half to one quart of refreshing alcohol-free beverage, thus avoiding excessive thirst at night and preventing the taking of unnecessary amounts of wine and beer. With and after dinner there is usually no further need for liquids, although the drinking of one glass of water before going to bed is very often prescribed for patients, the kind, amount and repetition of the drinks depending on the case.

THE TEMPERATURE OF DISHES AND BEVERAGES.

The mouth, the throat and the esophagus serve the purpose of warming or cooling the food and drink so that they never reach the stomach as cold or as hot as they are taken into the mouth. Normally, unpleasant warmth

is noticed in the stomach when ingested food or drink is 5 degrees over the body temperature. Foods 15 degrees below body temperature cause a disagreeable sensation when taken into the stomach. Through habit we can raise the tolerance for warm foods slightly and quite considerably for cold foods. The best temperature for foods and drinks to enter the stomach is within a limit of 5 degrees below or above body temperature. The mouth can tolerate greater differences in temperature, from freezing up to 55° to 60° C. Generally, we do not take into the mouth food or drink of a temperature higher than 50° C.

1. **Warm Dishes and Beverages.**—Warm solid food tends to become cold during mastication, being reduced sometimes from 50° C. to body temperature. Hot thin liquids are cooled before reaching the stomach by contact with tongue, palate, throat and walls of the esophagus. This is not the case with hot thick soups and puddings, the heat of which is much higher. A spoonful of pudding at 50° or 52° C. will produce pain on entering the stomach, while the same amount of broth at the same temperature causes no discomfort. Consequently, the temperature of thick soups and puddings should never exceed 45° C., which is the most suitable temperature for all hot foods. Drinks, such as tea and coffee, are taken at about 42° to 44° C. Very strong coffee, generally drunk very slowly reaches 50° to 55°. Cocoa, chocolate and milk should also be served at the same temperature as thick soups and puddings. Most warm dishes taste better if they are taken at a temperature higher than the body temperature.

2. **Lukewarm Dishes and Beverages.** — By the term "lukewarm" we mean a temperature at which the food begins to taste cool. This is between 50° and 20° C. Generally lukewarm dishes and beverages are not very tasty, they lack the pleasant sensation of heat and the refreshing one of cold. A very few beverages are exceptions to this

rule, for instance, red wine (the temperature of which should be about 30° C.), the sweet wines of higher alcoholic strength and for some individuals even milk.

3. **Cold Dishes and Beverages.**—Some solid foods are generally eaten moderately cool. Some of these foods need considerably more cooling before the real taste is brought out. Instances are: fruit, meat, fish, vegetable salads, all jellies, caviar, and oysters. Even though they are refreshing in the mouth they lose the cooling effects on the system, as mastication and swallowing warm them considerably before they reach the stomach. It is different with liquids, which give us the sensation of refreshment only if they do not exceed a certain temperature. The limit is individually variable, commonly between 15° and 16° C. Light white wines are most palatable between 12° and 15°, fruit juices, lemonade, carbonated table waters between 10 and 12 degrees, although some prefer them at 7 to 8 degrees. Below this temperature all drinks lose their aroma and only the sweet acid taste remains. It is different with ice cream. We eat ice cream usually in very small quantities, and the mouth warms it enough to enable us to distinguish its palatable tasty qualities. In general, taste regulates the temperature of hot and cold dishes.

Cold drinks in large amounts are harmful to the stomach. The thirsty are warned against drinking too quickly a large amount of cold water for it is a violent stimulant of the stomach and intestines, producing energetic peristalsis and resulting diarrhea. Sometimes it produces gastro-intestinal catarrh, and it is rather dangerous for the circulatory system as sudden cold stimulus in hot weather can, through the influence on the sympathetic nervous system and blood-vessels, produce a shock. Such accidents are seen in mountain climbers and enforced marches. The drinking of great amounts of ice water during meals is certainly very harmful, and many cases of stomach dyspepsia

are due to it, as the secretory and motor function of the stomach is retarded. Liquid taken at body temperature is the most suitable for stomach, intestines, circulatory and sympathetic nervous system.

HYGIENE AND THE PREVENTION OF BACTERIAL INFECTION.

We are liable to take into the gastrointestinal tract a large amount of microscopic material (bacteria especially), where the general conditions and cleanliness of our surroundings are not exemplary. This is the case, not only in tropical countries, but to a great extent in more civilized ones. By boiling, we know that we can avoid infections but not intoxications, for instance, botulism, through decomposed meat, mushroom poisoning, etc., but foods and drinks are liable to be infected after they are cooked. To guard against any impurity of infection, great care in preparing the food to be eaten is absolutely necessary.

HYGIENE OF THE KITCHEN.

The Chinese formerly required their tea pickers to bathe daily. We should insist on our cooks doing likewise. Cooks should always wear white washable clothes. Keeping food and utensils clean should be their most important task. Coughing and sneezing should be avoided, also the habit of tasting from spoons and putting them back into the dishes. Hands and nails should be carefully cleaned. The kitchen should be washed with soap and water. Provision for good ventilation of the kitchen should be made in planning houses. During summer, unclean dishes attract flies and diseases can be transmitted through them, such as typhoid fever, malaria, dysentery, cholera, etc. Screens to keep out mosquitoes should be put in every kitchen during the summer months.

HYGIENE AT MEALS.

Washing the hands before every meal should become a habit. Shaking hands when greeting guests is really unsanitary. The drop infection, so-called, caused by coughing while talking, is a well-known means of transmitting disease.

PATIENT'S FOOD, RESTAURANT FOOD AND FOOD DURING TRAVEL.

1. The patient's food does not differ much from ordinary good home cooking. The following dietetic rules are important:

(*a*) Food to be made of the best raw materials.

(*b*) Use only butter as fat.

(*c*) Use spices only in such amounts as to make food tasty.

(*d*) The patient's diet should be simple in preparation and in the number of courses.

(*e*) There should be kitchen facilities for preparing the different foods for the individual patient, especially for those suffering from diseases of the gastrointestinal tract, kidneys and metabolism.

(*f*) The diet should be prepared in every individual case, according to the advice of the physician or to the special personal taste of the patient. There should also be facilities for the preparation of meals at any hour of the night or day.

(*g*) Food should be prepared in the diet kitchen in an attractive way so as to increase the appetite and general feeling of well-being of the patient.

2. The better restaurant kitchens are supposed to use the best raw material in preparing their foods. They use more spices than are really suitable for the gastrointestinal and renal patients. The enormous variety of dishes tempts a great many people to eat more than is absolutely neces-

sary; especially is this true of the general table d'hôte meals, where at least two or three fish and meat dishes are on the menu at every meal. By this protein overfeeding many people are harmed, especially where weak conditions of the stomach, intestines and kidneys prevail, and in some gouty and diabetic patients as well. In traveling it is hard to adhere to any diet as the patient has to take just what he finds on the bill of fare or on the regular menus, thus offsetting on the way home the benefit derived from the health resort treatment. Traveling in the tropics is beset by the danger of bacteria in food. Unboiled water unquestionably is the most important carrier of infection. While tourists generally avoid drinking water, they do not always avoid the use of this water in cleaning their teeth. They also drink milk which very often in the tropics is nothing more than the condensed milk diluted with hot water. Lemonades, soda, mineral water in bottles sometimes contain infections, because of the cleaning of these bottles with ordinary unsterilized water. No raw vegetables or salads should be permitted, and of fruits only those having skins.

2. DIET FOR REDUCING WEIGHT.

There is no definite dividing line between the obese individual and the individual with a normal amount of body fat. The best measure for determining obesity is the proportion between the height and weight of the body, provided the excessive weight is not due to large muscles. We may consider an individual slightly obese if the weight is between ten and thirty pounds above normal. A moderately obese individual carries between thirty and fifty pounds above normal, while the highly obese individual weighs more than fifty pounds above normal. Obesity is not as serious a matter in people with strongly developed muscles as in people with weak muscles. The amount of

muscular development also must be taken into consideration in all forms of treatment of obesity. The cause is not as important, however, as the question whether obesity is to be regarded as dangerous to the health of the patient at the present time or in the near future. In considering whether the patient's weight should be kept the same or reduced, we must take special notice of the state of the heart, of the condition of the organs of locomotion, and of the disproportion between chest and abdomen.

Although there are certain medicinal treatments of obesity, diet is by far the best measure. The question of satisfying the appetite of the patient presents the greatest difficulty in reducing by diet. We must lower the caloric value of the diet and, at the same time, give the food in such a form that the patient is not tormented by the feeling of hunger. Even with the most carefully selected diet a certain self-control and co-operation on the part of the patient is necessary, without which an effective reduction in weight cannot be accomplished. According to the degree of obesity we differentiate three kinds of diet: first, supplying 2000 calories; second, 1500, and, third, 1000 per day.

In the first of these diets it is not necessary to prescribe exactly for each meal, our purpose usually being achieved by correcting, in general, faults which the patient makes in his diet. For instance, one patient eats too much fat meat, another an excessive quantity of cake, while still another eats too frequently. Later, we include one day of each week for exclusive milk or fruit diet, in that way usually bringing about, without privation, a loss of one to three pounds of weight a month. This may continue for a year or until the desired loss of weight has been achieved, without decreasing the strength of the patient in any way. They become accustomed also to considering carefully the quantity and quality of their meals.

Diet for Obesity—Second Degree (von Noorden).

		Prots.	Fats.	Carbos.	Cals.
Breakfast	Tea or coffee, with little sugar or saccharine	....	....	....	....
	100 grams Lean meat (raw weight)	20.0	1.5	0.2	96
	50 grams Cucumber	0.5	....	1.5	7
Second breakfast	200 grams Fresh fruits	1.4	....	16.0	70
Luncheon	200 grams Beef broth	1.2	1.0	....	14
	100 grams Lean meat	30.0	2.2	....	144
	200 grams Vegetables, or more.	4.0	0.4	9.0	57
	200 grams Potatoes	4.0	0.2	40.0	180
	10 grams Butter (used in the preparation of meats and vegetables)	....	8.2	....	76
	200 grams Stewed fruits, sweetened with little sugar or saccharine	1.4	....	16.0	70
	100 grams Fresh fruit	0.7	....	8.0	35
Tea	Tea	....	....	....	....
	One egg	5.9	5.2	....	72
Dinner	Two eggs, or the caloric equivalent of 150 grams meat	11.8	10.4	....	145
	200 grams Vegetables	4.0	0.4	9.0	57
	10 grams Butter (used in the preparation of meats and vegetables)	....	8.2	....	76
	200 grams Potatoes	4.0	0.2	40.0	180
	50 grams Radishes	0.6	....	2.0	11
	100 grams Fresh fruits	0.7	....	8.0	35
	50 grams Dry cheese	17.8	6.1	2.1	136
Bread for the whole day	100 grams Bran bread	8.1	0.7	47.6	234
	Approximate total...	116	45	200	1600

In the second of the above-mentioned diets we first decrease the amount of fat, forbidding bacon, extremely fat meat, fat sausage, fat cheese, cream, soups, and an excess of fat in the preparation of vegetables. All other kinds of meat, fish, dry cheese and eggs are allowed. Butter is given in moderate quantities only. Carbohydrates, sugar and sweets are forbidden, as are cakes and puddings prepared with too much fat. Bran bread may be eaten in

moderate quantities; potatoes, fruits and vegetables may be eaten in any amount. Each week one day is set aside when we allow milk or fruits and vegetables only. All alcoholic beverages must be avoided. This kind of diet requires, of course, certain privations on the part of the patient, especially the withdrawing of any large quantity of fat, but it never causes hunger as the diet gives full choice of all foodstuffs of animal origin in addition to potatoes and vegetables; the latter especially can be taken in a large quantity. This large choice makes selection of the diet easy in the home or the restaurant. This type of diet must be kept up for a long time. It can be used for highly obese individuals as well, but its results are not as sure. The table (on page 88) is an example of this kind of diet showing the content of proteins, fats and carbohydrates in grams and the caloric equivalent.

THE THIRD DEGREE OF WEIGHT-REDUCING DIET.

As mentioned above, this diet is used for people whose weight is more than fifty pounds above normal. Here it is essential to weigh exactly all the foodstuffs taken. For an adult of average height not more than 1000 calories are to be given. We must pay more attention also to a consideration of the calories to be introduced in the form of protein, in the form of carbohydrate and in the form of fat. The proteins must not be cut down too much if the patient is to retain his strength and sense of well-being. We recommend 110 to 120 grams of protein daily at the beginning of the treatment, which quantity can be gradually increased up to 150 grams. This, of course, can be done only if we supply at the same time a suitable quantity of carbohydrates and fats. Carbohydrates and fats are to be chiefly restricted.

Experimentally and empirically it has been shown that it is better to restrict the fats than the carbohydrates for

the following reasons: The carbohydrate-containing diet gives us a greater variety of palatable foodstuffs, the large volume despite the relatively small number of calories giving the patient the feeling of being sated. Further, carbohydrate-containing foods preserve the proteins of the body to a greater degree than fat-containing foods, a fact for which there is no exact theoretical explanation. Fatty foods can be given only in relatively small volume because of their high caloric value, consequently the patient's appetite is not appeased and he becomes nervous and weak. It is difficult for any one to stand for a protracted period the most unpleasant sensation of hunger.

Further, fruits and vegetables contain a high amount of all the salts essential for our body nutrition. These are lacking in fats. The following table contains the foods rich in carbohydrates and poor in fat on the one side, and the ones rich in fat and poor in carbohydrates on the other side, both representing the quantity of 500 calories. It is apparent from this table that from two to five times as much fat, so far as the volume is concerned, may be introduced in the form of carbohydrates.

Carbohydrate Rich. Fat Poor.		Grams.	Carbohydrate Poor. Fat Rich.		Grams.
Potatoes	about	570	Fat beef	about	165
Bran bread	"	240	Fat pork	"	125
Fresh green peas	"	740	Fat lamb	"	145
Carrots	"	1560	Fat goose	"	105
Green beans	"	1100	Mettwurst	"	110
Apples	"	1000	Medium fat ham	"	200
Skimmed milk	"	1200	Bacon	"	75
			Butter	"	65

Another important consideration is the quantity of liquids obese individuals should take with their meals. The old opinion that a large amount of water increases, and a small amount decreases, obesity is erroneous. In reality we cut down the water intake because this restriction favorably influences the organs of secretion and excretion. Further we decrease a large quantity of fluid in

the fat tissue of the patient. A considerable restriction of water at the beginning usually results in the loss of six or eight pounds in the first week. This loss of water increases the muscular activity of the patient as well as improving his sense of well-being. For a long time during treatment we do not attempt to lower the quantity of introduced water below one quart a day. Later on, for one day a week, we give only about one-half a quart of water.

We reach the conclusion, therefore, that this strict form of reducing diet can be performed most successfully by stringent restriction of all fats, with a normal quantity of protein and the addition of enough carbohydrates to satisfy the appetite and, eventually, the feeling of hunger.

Below is a table of foodstuffs which have such a low content of calories that the patient can take them in any quantity he may desire without adding any material food value to the diet.

One hundred grams of the following foods contain:

	Proteins. Per cent.	Fats. Per cent.	Carbo-hydrates. Per cent.	Calories.
French beans	2.7	0.1	6.6	39
Asparagus	1.9	0.1	2.4	19
Rhubarb	0.5	0.6	3.2	21
Cauliflower	2.5	0.3	4.5	31
Red and white cabbage	1.8	0.2	5.6	32
Sauerkraut	1.2	0.5	2.7	21
Lettuce	2.0	0.4	3.0	24
Tomatoes	0.9	0.2	4.0	22
Cucumbers	1.1	0.1	2.2	14
Radishes	1.2	0.1	3.8	21
Beets, pickled	1.1	..	4.9	25
Broth (fat strained off)	0.6	0.5	..	7

It is, therefore, possible even within the limits of this highly restricted diet to give the patient an agreeable variety of food. In correctly carried out fat-reducing diet, the health and strength of the patient should not be weakened, but on the contrary his bodily resistance and his physical power should be increased. Not every fat person

DIET FOR OBESITY—THIRD DEGREE (VON NOORDEN).

		Prots.	Fats.	Carbos.	Cals.
Breakfast	Tea with lemon	....	....	....	....
	Two eggs	11.8	10.4	....	145
	25 grams Bran bread	2.0	0.2	12.0	59
Luncheon	200 grams Broth without fat.	1.2	1.0	....	14
	200 grams Lean meat (raw weight)	40.0	3.0	0.4	194
	100 grams Potatoes	2.0	0.3	20.0	93
	200 grams Vegetables	4.0	0.4	9.0	57
	100 grams Cucumbers (vinegar, without oil)	1.1	0.1	2.2	14
	200 grams Fruits, sugar-poor.	1.0	....	13.0	57
	Black coffee	....	....	....	....
Tea	Tea with lemon	....	....	....	....
Dinner	Tea	....	....	....	....
	200 grams Lean meat (raw meat)	40.0	3.0	0.4	194
	100 grams Potatoes	2.0	0.3	20.0	93
	200 grams Sauerkraut	2.4	1.0	5.4	34
	100 grams Tomatoes or Radishes	0.9	0.2	4.0	22
	200 grams Apples	0.8	....	24.0	131
Butter for the whole day	20 grams Butter	....	16.4	....	153
	Approximate total	109	36	110	1260

is constitutionally fitted for undergoing such treatment. If bad effects are evident at the start of the treatment the diet must be changed immediately. This type of treatment is obviously best carried out in sanitariums. It should not last longer than from four to five weeks and during this time the patient should not lose more than fifteen pounds. On the other hand we can repeat the treatment two or three times during the year and, in the meantime, it is desirable to confine the patients to a diet corresponding to that described for the second degree. Misuse of these fat-reducing treatments is strictly to be avoided, especially in cases where people for eleven months of the year eat indiscriminately, attempting in one month to bring down the body weight considerably by one treatment. The fore-

going table gives a sample bill of fare, arranged in accordance with the last mentioned diet, the total calories reaching about 1200.

An additional means of effecting a reduction of fat is an increased amount of muscle work. Muscular work without diet cannot reduce body weight, for exercise is followed by an increased appetite which counteracts immediately the small loss of weight produced by it. By sweating it is possible to lose weight, but this is only temporary. The loss of weight here is caused by the loss of water, which is replaced in a very short time. There is no material loss of fat. Of the drugs employed in fat reduction, iodine and extracts of the thyroid glands should be mentioned. Their use is strictly confined to medical prescription. The formulas which are so much advertised for fat reducing contain usually one of these drugs and people should be warned against their indiscriminate use.

3. DIET TO INCREASE WEIGHT.

By thinness we mean a body state in which the fatty tissue is scarce while the muscle volume is normal. Loss of weight leading to thinness may be due either to an increased oxidation energy of the protoplasm or to some cause such as lack of food, lack of appetite, bad absorption, bad choice of foods or loss of sugar with the result that the amount of absorbed foods is not equivalent to the needs of the body. These two conditions lead to thinness: the first form may be termed endogenous thinness (caused inside), the second exogenous thinness (caused outside).

ENDOGENOUS CAUSES OF THINNESS.

1. Emaciation due to the thyroid gland. The chief cause of endogenous loss of weight is for the most part hyperthyroidism. In exophthalmic goiter oxidation is in-

creased from 20 per cent. to 60 per cent. The patient loses weight even if on a normal nutritive diet. In this class also belong cases of loss of weight in old people and in goiter patients who have been overdosed with iodine. There are people who in spite of overfeeding remain thin. Overfeeding treatments are not always successful. In all these cases an increased secretion of the thyroid gland seems to be the cause and, generally, there are symptoms explaining this, such as perspiration, irritability of the heart, loss of strength, etc.

2. Other endocrine glands which have a relationship to the thyroid gland may also be the cause of the increased metabolism, as in acromegaly and hypophyseal marasmus.

3. Fever. Febrile conditions increase the metabolism up to 40 per cent.

4. Constitutional asthenia, as in cases with such symptoms as weak muscles, underdevelopment of the heart and arteries, and neuropathic diathesis.

EXOGENOUS THINNESS.

This thinness is due to debility caused by digestive troubles (diseases of the esophagus, gastric ulcers, hyperacidity, stomach atonia, constipation, hemorrhoids, fermentative dyspepsia, etc.), or to disturbances of absorption, to loss of sugar (diabetes), to improper feeding, overexercise or lack of food.

DIET AND WEIGHT INCREASE.

In considering the state of nourishment of an individual we have to take into account two important factors; first, the volume of muscle and, second, the quantity of reserve fat. If both of them are developed in the right proportion we then consider the individual's state of nourishment as normal. The volume of muscle furnishes us with an index

of the protein content of the body. There is no definite standard of muscle development. In general, the maximal development of muscle which an individual is able to acquire may be considered the optimal also. Muscular development is dependent upon certain hereditary influences and, even if trained from childhood, not every person can acquire a high degree of muscular development. Further a satisfactory state of muscular development can be reached only by a combination of an adequate diet and sufficient muscular work, the latter being by far the most important.

We speak of a normal state of nourishment in an adult, so far as the fat is concerned, if 18 to 20 per cent. of the male and 25 to 28 per cent. of the female is represented by fat. These are average figures for the normal individual. Under certain pathological conditions we sometimes recommend a considerably higher percentage of fat, especially in tubercular and diabetic conditions. It is possible to improve an individual state of nourishment only if we increase the introduction of foodstuffs over normal, that is, over a caloric quantity in which the weight of the individual stays constant. On the whole we can say that an increase of the caloric value of the daily foodstuffs increases the body weight in definite proportion, for example:

Daily Excess Quantity of Calories.	Weekly Increase of Weight.
500 to 800 calories	600 to 1000 grams
800 to 1200 calories	800 to 1200 grams
1200 to 1800 calories	1200 to 2000 grams

As above mentioned we must distinguish between muscle volume and an increase of fat. For the growing body, suralimentation, that is, the introduction of a quantity of foodstuffs in excess of the caloric requirement is considered normal from a nutritive standpoint. In the growing body it is mainly the proteins of the food that are retained and used in the body tissues. In the adult it is not possible to increase considerably the protein content of

the body by simply overfeeding. As mentioned above, any considerable increase of the muscle volume of the body is possible only if we combine over nourishment with regular muscle training. It is much easier to increase the quantity of fat of the body by an overfeeding diet. We can say, then, with almost absolute certainty that, if pathological conditions do not prevent it, food is retained and stored in the tissues. In average conditions 75 to 80 per cent. of the foodstuffs over and above the normal quantity is stored in the body chiefly as fat, and in a small quantity as carbohydrate-like substances, mainly glycogen.

If we increase the quantity of introduced foodstuffs over a long time in the same proportion, the resultant increase of weight through fat storage continues until the muscular activity of the body balances the increased quantity of feeding. The result is that the same quantity of food which was overnourishment for the former state of the body now becomes a normal nutritive amount. If we wish to increase the body weight still further, then we must add further to the already increased amount of introduced foodstuffs. Formerly it was the commonly accepted opinion that an increase in the food intake resulted in a greater consumption of calories, and the term "luxurious consumption" was therefore applied to it. This opinion is only partly correct. To be sure the appetite increases the oxidation up to a certain point of overfeeding, but investigations have proved that this increased oxidation never amounts to more than 20 per cent. There are only a few exceptions to this rule; for example, for a short period during convalescence after typhoid fever or after a febrile period in tuberculosis there is a considerably increased oxidation which renders overfeeding more difficult.

The reasons, why people without any pathological defects stay thin under a diet which makes other people of the same height and same degree of muscular work much

stouter, are in many cases difficult to ascertain. Possibly in different people the energy of oxidation in the cells of the body is varied, and, again, in different people on the same diet the absorption of foodstuffs in the intestines varies. Also the different oxidation energy of the cells of the body may have many other causes. First of all, the influence of the so-called endocrine glands of the body must be mentioned. The thyroid gland, as well as the hypophyseal gland, and also that portion of the sexual glands which is supposed to have mainly an internal secretion, are all becoming of increasing importance.

INDICATIONS FOR OVERFEEDING TREATMENT.

Overfeeding is indicated where the stage of nutrition has not reached its optimum, or where through sickness or improper modes of life the patient's weight has suffered. The overfeeding diet is indicated in:

1. Tuberculosis.
2. Constitutional asthenia.
3. Contracted asthenia.
4. Thinness without reduction of the muscle volume.
5. Convalescence after serious diseases.
6. Rundown condition.
7. Neurasthenia and hysteria.
8. Diseases of the digestive organs.
9. Hyperthyroidism.
10. Cosmetic purposes.

FOODS USED IN OVERFEEDING.

1. **Proteins.**—Proteins have no great overfeeding value, their caloric content being small; 120 grams a day being the greatest amount used in overfeeding. This amount will be easily covered by the milk, eggs, meat and cereals used in the diet. For instance, 125 grams of meat, one quart of milk, 4 eggs, 200 grams of bread, 500 grams of cereal flour will be equal to 114 grams of protein. Cheese and legumes may be used to increase the protein content of the diet, as well as some of the medicinal foods such as ovaltine, nutrose, plasmon, sanatogen (made of milk), or glidin (made of vegetables), or fersan (iron-containing protein).

2. **Carbohydrates.**—Carbohydrates are the best for overfeeding. They allow a very tasty preparation and great variety and they are also very suitable for the gastro-intestinal tract. With the exception of diabetes and some forms of fermentative dyspepsia, carbohydrates may be widely used in overfeeding. The use of flour and milk allows us to reach very easily 300 to 350 grams of carbohydrates a day in a volume of 1500 to 1750 cubic centimeters. In choosing the carbohydrates we must use good judgment. All combinations of cereals and milk are possible. The most common in use are as follows:

100 to 240 grams Carbohydrates in form of bread (about 200 to 230 grams bread).
30 to 40 grams Carbohydrates in form of rice, noodles or macaroni (about 200 grams in volume).
40 to 50 grams Carbohydrates in form of soups or puddings (oatmeal, barley, rice, potatoes, lentil or wheat flour).
20 to 40 grams Carbohydrates in starchy legumes (potatoes, beets, peas, beans).
33 to 45 grams Carbohydrates in form of milk, ¾ to 1 quart.
20 to 40 grams Starch in desserts.

In the foods just mentioned there are 355 grams as a maximum in the form of milk, flour and cereals. This

arrangement may be varied according to the individual case. Sugar up to 200 grams a day (equal to 820 calories) improves the diet and increases its feeding value (as an addition to drinks and desserts, and added to fresh and stewed fruits), honey, milk, sugar and sweet dry fruits (figs, dates, raisins and plums). Generally we do not exceed 400 grams of carbohydrates daily in the overfeeding diet, two-thirds in the form of cereals and one-third in the form of sugar.

3. **Fats.**—In the overfeeding diet the optimum amount of proteins is 120 grams daily (410 to 490 calories), of carbohydrates about 400 grams (1640 calories), totaling about 2100 calories daily. To cover the balance we use fats, the amount of calories needed (1120 to 2000) will be covered by 130 to 215 grams of fat. The most important consideration in the use of fats is to furnish a high caloric value in a small volume (1 gram is equal to 9.3 calories). Among the fats the milk fat (milk, cream, butter, fat and cheese) plays an important rôle. Other fats, as bone marrow, bacon, fat meats as ham, sausages, meat of overfed animals (beef, pork, mutton, goose), fatty fish, egg yolks, vegetable fats, olive oil, are of rather secondary importance. Among the last mentioned, the egg yolks, bone marrow, bacon and fat ham are the most useful in a long continued overfeeding diet.

Generally the fat addition will be proportioned as follows: about 100 grams fat (120 grams of butter or 120 grams bone marrow) will be added to soups made of oatmeal, barley, or legume flours, or in vegetables, especially tomatoes, cauliflower, asparagus, artichokes, carrots, celery, spinach or in ground meats, as in white meat (chicken), calf's liver, calf's brains; about 100 grams of fat in the form of 120 grams of butter to be used during the day on bread or baked potatoes with 30 grams of fat in the form of egg yolks (6 egg yolks equal to 30 to 40 grams of butter), 35

to 75 grams as cream (100 to 300 grams), 30 to 50 grams of fat in the form of different dishes as meat, fish, cheese or sausage. We dispose thus of about 300 grams of fat daily, but we cannot expect to reach this level on the first day of the diet, it being essential to add them slowly each day until the desired amount is reached.

Alcoholic Beverages.—It is difficult to decide to what extent alcoholic beverages should be added to the overfeeding diet. Generally a small quantity of wine or beer will help the patient to take his rich meals. Wines such as Tokay, Port, Madeira or Malaga are desirable. With fatty meals or with dinner a glass of beer will be very agreeable (dark beer is more nourishing than light beer).

Liquids.—Reduction or increase of the liquid volume has a very slight influence on the fat metabolism. In the usual mixed liquid semi-solid overfeeding diet, reduction in the liquids is rather an advantage. We do not exceed 1500 cubic centimeters each day, coffee, tea, cocoa or milk, soups, wine, beer or fruit juices being included. Generally we arrange to limit the intake of liquids during the afternoon hours so that only one-third of the daily allotment is consumed at this time. With the main meal, liquids should be taken in very small quantities as too much liquid with the solid meal may distend the stomach and cause discomfort.

4. DIFFERENT FORMS OF OVERFEEDING DIET.

(Von Noorden.)

1. A Mixed Semi-solid and Liquid Diet.

This diet is very rich in calories, containing a large amount of fat, especially butter. As a rule, we do not exceed 4000 to 5000 calories daily.

Breakfast.	Milk, 200 grams. Cream, 100 grams. Sugar, 10 grams. Eggs, 2. Bacon, 20 grams. Rolls or whole wheat bread and butter.
11 o'clock.	Cereal flour soup, butter, 60 grams mixed with the soup, rolls, and butter.
Luncheon.	Bouillon, bone marrow, 20 grams. Meat, 150 grams (cooked) or fish. One egg. Vegetables, about 150 grams. Butter, 40 grams. Potatoes, 150 grams or mashed potatoes with milk or cream and butter (20 grams). Rolls, butter, cheese. Cream, 150 grams, used in a dessert or ice cream. Sugar, 20 grams. Fruits, 200 grams, sugar, 40 grams, added to the fruit.
Afternoon Tea.	Milk, 200 grams, as coffee, Swedish tea,* cocoa or chocolate. Sugar, 10 grams, added to the drink. Rolls, butter. Ham, 70 grams, or two eggs.
Dinner.	Eggs. Potatoes, 150 grams. Butter, 20 grams. Salad. Milk, 400 grams. Cereal, 30 grams. Sugar, 30 grams. Fruits. Sugar, 40 grams added to the fruit. Rolls and butter.

* Tea made with boiling milk instead of water.

Before Retiring.—Soup made of 20 grams of cereal, and 50 grams of butter.

This diet will contain about:

Milk	800 grams.
Cream	250 grams.
Sugar	150 grams.
Eggs	5
Bacon	20 grams.
Butter	300 grams.
Bone marrow	20 grams.
Ham	70 grams.
Meat	150 grams.
Bread	250 grams.
Potatoes	300 grams.
Cereals	70 grams.

Equal to 6475 calories, of which one-third is covered by butter.

2. Form of a **Liquid Semi-solid Overfeeding Diet.**

The usual amount would be:

Milk	1500 grams.
Cream	500 grams.
Sugar	100 grams.
Cereals or legume flour	70 grams.
Potatoes	250 grams.
Bread	180 grams.
Eggs	4
Broth	250 grams.
Sour wine	½ pint.

Equal to diet containing 5000 calories. Using these figures, we can make the following daily program:

8 o'clock. Milk, 300 cubic centimeters.
Cream, 100 cubic centimeters.

10 o'clock. Légume flour soup made of 35 grams flour, 60 grams butter and 30 grams cream.

12 o'clock. Mashed potatoes, 300 cubic centimeters milk and 100 cubic centimeters cream, 60 grams butter.

2 o'clock. Broth with 2 eggs.

4 o'clock. Milk, 250 cubic centimeters; cream, 100 cubic centimeters, and malt sugar, 50 grams.

6 o'clock. Hot egg yolk (Chaudeau: 250 cubic centimeters, milk; 70 cubic centimeters, cream; 2 eggs); eggs, 2 grams; bacon, 20 grams, rolls or whole wheat bread and butter.

8 o'clock. Rice pudding: 35 grams rice flour, 400 cubic centimeters milk, 400 cubic centimeters cream and 50 grams milk sugar.

This diet has a very high caloric value and is very suitable and easy to arrange. It is advisable in cases of poor digestion or lack of appetite in which solid food is distasteful. Isolation of the patient, quietness, some muscle exertion (massage), and in some cases sanitarium treatment are also desirable.

5. DIET OF CHILDHOOD AND ADOLESCENCE.

The growing youth does not need a special form of diet, as the normal child's diet is well regulated by his appetite and natural selection of food substances in their proper proportion. In abnormal conditions and diseases it is well to employ the diet corresponding to that advised for the adult. The overfeeding diet with certain changes in the calcium and iron percentages is most frequently employed, as anemia and undernourishment are the most customary ailments of childhood. In some cases where the bone formation is retarded the addition of phosphorus, preferably in the form of medicine, will be found of advantage. The most common calcium-containing foods are milk, green vegetables and egg yolk. The daily amount of calcium necessary for the body is between 2 and 2½ grams. The daily iron requirement is 20 to 30 milligrams a day. The amount of iron in the human body is about three grams, a

considerable percentage of which is in the hemoglobin. The liver, spleen and pancreas are reservoirs for iron. The iron reserve of the body, if no great loss of blood occurs, is very slowly used up, a very fortunate circumstance considering how small an amount of iron is contained in the foods. Green fruit, green vegetables, milk and eggs are the best additions to the diet of growing young people and will cover the requirement of minerals previously mentioned.

6. DIET OF THE AGED.

The diet of vigorous old people does not differ materially from the diet of the young and, likewise, the diet prescribed for old people in sickness does not differ materially from that prescribed for young people in sickness. Greater care must be taken in the arrangement of special diets for the old. Only for very old and weak people is a special diet form necessary. In old age the desire for variety in the diet decreases and, as in childhood, the necessity for a uniform and simple diet becomes more and more evident. The following menu will give an idea of the most suitable and practical diet in which the amount of food has to be regulated according to the individual case.

Morning in bed.	Glass of warm milk (with milk sugar where there is constipation) or 200 grams of oatmeal soup.
Breakfast, also in bed.	Cup of coffee or tea or chocolate with milk, rye bread, zwieback or toast with butter, honey or marmalade, one egg, a few spoonfuls of apple sauce or prunes.
11 o'clock.	Cup of soup made of cereals or legume flour. Small glass of sour wine.
Luncheon.	150 to 200 cubic centimeters of broth (beef or chicken), very tender meat as white chicken, or cooked hash of veal, beef or chicken, or well boiled soft fish,

	mashed potatoes or chestnuts, beets or other vegetables, boiled rice or noodles. Light dessert with stewed fruit or fruit sauces. Glass of wine.
Afternoon tea.	Like breakfast.
Dinner.	Oatmeal or barley with milk, sugar and stewed fruits or fruit sauces, one egg, rolls as for breakfast (eventually softened in milk).
Before retiring.	200 to 250 cubic centimeters of milk (if necessary).

The daily amount of milk should be about one quart, half in the form of drinks, the remainder in milk and flour puddings.

7. DIET IN PREGNANCY.

The normal pregnant woman does not need a special diet form. The diet previous to pregnancy, if it was suitable and kept her in good health, will be found just as useful during pregnancy. Only if disturbances arise is it necessary to change the diet form. Attention would first be directed to a change and improvement in the general conditions, to a change in the amount of protein employed, and to the use of minerals.

In some circles where formerly overfeeding of the pregnant was considered beneficial there were unpleasant sequelæ, and the subsequent obesity especially was very difficult to dispose of. The opinion that an overfeeding diet will produce a more vigorous baby is absolutely false. Some women have a tremendous desire for food, asking for very frequent meals. This sensation is due more to neuropathic conditions and should be combated. After one or two weeks this false hunger sensation will disappear. While the overfeeding of the pregnant in good health is undesirable, it is necessary to improve

the condition of the pregnant women in delicate health. This is usually an easy matter. There are well-known cases of young girls who have found it impossible to improve their weight, who as young women during pregnancy reach any increase of weight desired. The methods to be employed we have described in the chapter on "Overfeeding Diets." Generally an addition of 500 to 1000 grams of milk and of one to two cups of fat soups of cereals will accomplish what is desired. In some cases of obesity it is very essential to reduce in order to improve the strength and action of the heart. Generally this reducing diet is best employed between the fourth and seventh months. The vegetarian reducing-diet with intervening milk days is the best. We warn against the use of thyroid extract during pregnancy.

PROTEIN CONTENT OF THE DIET OF THE PREGNANT.

While in all books on obstetrics a diet rich in proteins is advised for the pregnant, of late a diet containing only about 80 to 100 grams of protein daily has seemed to be the most suitable. This does not mean that the diet of the weak and anemic pregnant woman should not contain milk, cheese, eggs, meat and protein preparations. Insufficient feeding damages the mother only, not the fetus. The small amount of protein in a diet of sufficient calories is not harmful to mother or child. We do not know, however, what influence on later generations the underfeeding of the pregnant, especially so far as the protein is concerned, will have.

DIET AND HEAD DIMENSIONS OF THE CHILD.

In the pregnant woman with small pelvis the indications are to prevent a too fast growth of the child, and to reduce the food value in the last two months of pregnancy.

The child's head will thus remain softer. A suitable diet arrangement would be as follows:

Breakfast.	125 cubic centimeters coffee or milk, 40 grams bread, butter, one or two eggs, raw fruit. Before or after breakfast a walk of 40 to 45 minutes.
10 o'clock.	Massage or gymnastics.
11 o'clock.	Raw fruit, 1 egg, 15 grams bread, little butter.
Luncheon.	Roasted or boiled meat, fish, vegetables with exception of beets and peas, salad, fruit, cheese, 125 cubic centimeters water or water with wine. No afternoon sleep.
4 o'clock.	Cup of coffee or tea, 15 grams whole wheat bread, butter, 1 egg. Walk 1 to 1½ hours.
7.30 P.M.	Eggs or cold milk, 125 to 200 cubic centimeters, 40 to 60 grams bread, butter, fruit, salad. No fat sauces or sausages, the vegetables boiled in salt water with very little butter, and the liquid amount in 24 hours not over 600 cubic centimeters.

This is a reducing diet with a large amount of protein, and the caloric value will be about 2000. Constipation of the pregnant should be regulated more through the diet than by medicine. All the physics contain substances which are passed through the blood and are thus harmful to the fetus. Some of them are liable to cause miscarriages. The anti-constipation diet should be rich in vegetables and raw or stewed fruits, whole wheat bread with 20 grams of milk sugar early in the morning. The legumes should be avoided on account of the tendency to gas formation. If this diet does not help, citrate of magnesia is the most advisable. The acute and chronic diseases of pregnancy must be considered in the same way as though occurring in non-pregnant conditions. Special care must be given to the diet in complicating diabetic and renal disorders.

8. DIET DURING CONFINEMENT.

It is still a matter for discussion whether meat should be given in the first days of confinement. While some praise the stimulating effect of meat on the milk secretion, others replace meat with eggs; different protein preparations such as plasmon, tropon or roborat are also often prescribed. Too large an amount of protein is inadvisable on account of increasing the work of the liver and kidneys. About 30 grams daily of such protein preparations are sufficient and milk protein preparations are to be preferred. Meat should be reduced to once daily, and foods which provoke gas formation, such as carbonated water, legumes, cabbage, fresh bread, etc., should be avoided. In some cases milk causes discomfort. Among raw foods, fruits are best. Alcoholic beverages in small amounts may be allowed.

Sample diet form:

Mornings.	250 to 300 grams milk with tea, coffee or cocoa. 30 to 40 grams white bread, toasted or zwieback with butter, honey or marmalade.
11 o'clock.	250 grams of thick soup made of rice, barley or oatmeal, with 30 to 40 grams butter, 1 to 2 zwieback.
Luncheon.	Beef broth, chopped meat or 2 eggs, spinach, lettuce, carrots, potatoes, boiled rice or noodles, stewed fruit or prunes with little dessert or ice cream.
Afternoon Tea.	As breakfast.
Dinner.	Two eggs, milk puddings, toast, butter, cheese, stewed fruits.
Night.	Milk as beverage, or orange juice or fruit juices. If thirsty, water or weak tea.

This diet program will cover the needs of the first week.

9. DIET DURING THE NURSING PERIOD.

After the first week the importance of an adequate feeding for the nursing mother is more evident. A badly nourished woman is not well able to nurse, and the mother suffers more from undernourishment than the child. The food amount should be sufficient to replace completely the milk produced in addition to the normal caloric requirements. This extra food requirement is greater now than during pregnancy. The caloric value of human milk varies, the average being 675 calories per quart; hence the mother should add to her diet food totaling about 800 calories in order to be able to give one quart of milk to the child. These calories are best supplied by the fats and carbohydrates which prevail in the human milk. Others advise as much as 1000 calories additional for the nursing mother. The 800 additional calories can be procured from the most assimilable foods as follows: About 1250 cubic centimeters of cow's milk or 1000 cubic centimeters cow's milk and two eggs, or 1000 cubic centimeters of cow's milk and 40 grams of oatmeal, 50 grams of rolls and 20 grams of butter. Besides this addition to the diet the nursing mother needs a large amount of water.

Often the excess in eating during the nursing period is very detrimental and leads to obesity; 10 to 30 pounds overweight is a very common condition during nursing. The average woman should eat as before pregnancy, except for allowing the amount additional for the child. If her former living and feeding conditions were not proper ones the nursing period is the time to make the necessary changes so far as quality and quantity of the food is concerned. An example of the normal diet during the nursing period follows:

Morning in bed.	250 cubic centimeters milk.
9 o'clock.	Tea or coffee with milk, meat or ham and eggs, or two eggs, bread and butter and honey.
11 o'clock.	250 cubic centimeters milk with rolls.
2 o'clock.	Soup, meat, vegetables and fruit.
4.30 o'clock.	250 cubic centimeters milk, bread and butter.
8 o'clock.	Dinner as usual.
10 o'clock.	Milk soup.

The daily milk amount totals about 1500 cubic centimeters corresponding to the mother's stage of nutrition. We only add to this protein rich diet a greater or lesser quantity of food according to the necessary caloric amount.

CHAPTER VI.

THE DIET IN DISEASE.

1. INFECTIOUS DISEASES.

In acute infections with fever the liquid diet is to be preferred, beginning with the pure milk diet, and later using the enlarged milk diet according to the condition of the patient in the febrile stage.

Typhoid Fever.

Until recent years it was customary to prescribe only a liquid diet, with a low caloric value. Milk, with the addition of whisky, coffee, cocoa, Nestlé flour, bouillon, thick soups made of tapioca, rice with egg, and later rolls, zwieback, beef tea, and meat juice made up the menu. Only at the end of the fever stage was the more nourishing diet given. Hydrochloric acid was employed before meals if meats were given. Beverages: Cold water, fruit juice, lemonades, cold tea, strong wine (Port, Malaga), beer.

The modern tendency is, on the contrary, to give a richer nourishment in the early stages of the disease, to prevent the loss of body proteins caused by the toxemia and fever. Because of the well-recognized weakness of the gastrointestinal apparatus in typhoid patients, and because of the long duration of the disease, the more easily digestible food must be chosen. In the convalescent stage after a relapse, great care should be used in the diet. Not until two weeks after the disappearance of the fever is transition to a more normal diet made.

Main food: Milk (not more than 1 quart daily), cream, milk sometimes replaced by cocoa, thick soups, buttermilk,

oatmeal (boiled for thirty minutes), also farina, barley, tapioca, corn flour, fruit or wine jelly. Beverages: Water, coffee, tea, fruit juices. The diet during the febrile period should contain 1000 cubic centimeters milk, 100 cubic centimeters cream, 1000 cubic centimeters thick soups, 200 grams jelly, 100 grams raspberry syrup, representing about 2000 to 2500 calories. To increase the caloric value of this diet we add eggs, raw or with wine, coffee, sugar (sometimes with milk), bouillon (because of its stimulating effect) and the artificial foods (Sanatogen or Somatose), or carbohydrates containing artificial foods. Nourishment every 2 to 3 hours. As soon as the patients gain appetite, starches are used in the form of cakes, toast, zwieback, easily digested vegetables in purées, carrots, asparagus, spinach, cauliflower, legumes, potatoes, fruit jellies, stewed fruits, jams. No meats should be allowed, until after the healing of the typhoid process, when the easily digestible meats may be added to the diet, either finely chopped or in purée form in soups, starting with brains, sweetbreads, then adding boiled white meat of chicken and gradually passing to the roast meats. Alcoholic beverages are not a necessity except to improve the taste of the food, as in wine jelly or eggnog or wine soup.

Paratyphoid Fever.

Diet as above described for Typhoid Fever.

Dysentery.

The proper care and nourishment of these patients is of very great importance. We give thick soups, made of rice, tapioca, oatmeal, barley, prohibiting water. To satisfy thirst we give smooth decoctions of salep, althea, ratanhia. In the weaker patients farina, rice, bouillon, wine, are also used. All food should be served quite warm. Our custom during the World War was to give the patients decoctions of garlic or the preparation made of garlic and salol, Allphen,

8 to 10 tablets daily, after 0.4 of calomel. This treatment was used in thousands of cases of dysentery patients, and was proven by experimental research work to have a direct antitoxic action. (Marcovici and Prof. Pribram, Wien. klin. Wchnschr., No. 37, 1915).

Diphtheria.

A nutritious diet (liquid) is indicated: Milk, soups with meat purée, eggs, fruit ices, with cream, and fruit juices. In threatened heart weakness employ alcoholics. In cases with kidney complications, a modified diet (salt poor, spice free) is indicated.

Influenza.

Symptomatic therapy. Mouth hygiene. During the febrile period employ a liquid diet. The internal medication which proved to be most effective was salipyrin with caffeine, after giving 0.4 of calomel. (Marcovici: "Experience during the New Grippe Epidemic and its Abortive Treatment." Wien. klin. Wchnschr., No. 36, 1918.)

Pertussis (Whooping Cough).

Anti-spasmophilic diet. Phosphorus and codliver oil internally. A rich diet. Frequent meals. If there is persistent vomiting during coughing spells, give nourishment after each spell. In my experience the following syrup has proven to be efficacious (Oriental remedy):

> One-half pound rock candy,
> One-quarter pound rice,
> One-half pound English walnut shells boiled for an hour in one quart water, strained and boiled again until the amount is reduced to one-half pint.
> Three to five teaspoonfuls during day.

Leprosy.

Fish food is supposed to be injurious in this disease. There is no scientific explanation for this. Generally a simple and nutritious diet should be recommended.

Bubonic Plague.

During the febrile period a liquid diet is indicated.

Asiatic Cholera.

Employ a liquid diet during acute stage and only gradually pass to a normal one. Among the foods allowed in the liquid diet are beef-tea, thick soups, milk, softened zwieback. Diluted hydrochloric acid, 10 drops twice a day before meals in ¼-glass of water, will help digestion. Garlic decoctions in milk or soups or its desiccated preparation, Allphen, acts very satisfactorily, as previously reported for dysentery. Allphen powder enemas also act very beneficially on diarrhea. (Marcovici and Max Schmitt, Wien. klin. Wchnschr., No. 33, 1915).

Typhus (Typhus Exanthematicus).

A liquid diet, especially cold, is used as nourishment for these cases, with buttermilk or yoghurt.

Tuberculosis.

See diet in Tuberculosis of the Lungs.

Syphilis.

Bland diet, no spices, no alcohol.

Tetanus.

The nourishment plays an important part. Fluids are necessary. If feeding by mouth or through the stomach tube is difficult, nutritive enemas or hypodermic oil injections should be tried.

Epidemic Cerebrospinal Meningitis.

During the febrile period a liquid diet is indicated: Soups, milk, milk dishes, artificial foods, made of protein or carbohydrates. The vomiting being of cerebral origin, there is no need to prohibit an adequate and frequent diet. Where the vomiting is very persistent, give small amounts of ice-cold drinks, and also hydrochloric acid to

improve the stomach condition. After the febrile period, the diet should be a normal one.

Acute Articular Rheumatism.

During the febrile period use a liquid diet. Light soups and milk suffice for the first few days. A larger amount of fluid is necessary, as tea, lemonade, mineral waters, to replace the loss of liquids through perspiration.

Varicella (Chickenpox).

During the fever period, protein-poor diet; later, general diet unless kidney complications occur.

Variola (Smallpox).

During the fever, light diet: Milk, soups, eggs, jellies. In mild cases, boiled ham, white meat, green vegetables, puddings, light desserts. After the fever period, we pass from the liquid to a mixed diet, choosing the foods most suitable in the postanemic conditions.

Parotitis Epidemica (Mumps).

Normal diet if the disease is not accompanied by fever; liquid diet if the contrary is the case.

Measles.

Liquid diet during the fever period. The complications will be treated accordingly.

Rubeolæ (German Measles).

This disease is similar to measles, but of very short duration (sometimes one day). Normal diet.

Scarlatina (Scarlet Fever).

Liquid diet during the fever period: Milk, thick soups, desserts, mashed vegetables, fresh stewed fruits; in cases of kidney complications, nephritis diet.

Anthrax.

Treatment mainly surgical. Diet simple, nourishing.

Malleus (Glanders).

Treatment surgical.

Foot and Mouth Disease.

Liquid, nourishing diet; also careful attention to the stomatitis aphthosa (mouth wash). Cold, liquid diet.

Lyssa (Hydrophobia).

Symptomatic treatment.

Mycosis.

No sweets, no milk (in adults). Tea, broth, jellies, meat purée, rice, farina pudding, saccharine instead of sugar. The poorly digestible vegetables prohibited.

Actinomycosis.

Treatment surgical.

Heine Medin's Disease (Acute Anterior Polyomyelitis).

Complete rest. Light diet. Orthopedic surgical treatment of the secondary paralysis.

Erysipelas.

Liquid diet.

DISEASES OF TROPICS.

Malaria.

A good quinine therapy will make other treatments unnecessary.

Trypanosomiasis, Leishmaniosis.

Symptomatic treatment and thyroid tablets; in some cases, salvarsan therapy.

Tropical Spirochetosis, Frambesia Tropica (Yaws).

Salvarsan treatment and liquid diet.

Remittent Fever (Febris Recurrens).

Salvarsan treatment and liquid diet.

TROPIC BACTERIAL INFECTIOUS DISEASES.

Malta Fever (Undulant Fever).

Symptomatic therapy. The secondary anemia will be treated with arsenic and iron, and a suitable diet.

Yellow Fever.

Symptomatic treatment. Large liquid amounts to promote elimination of toxins (tea, Vichy water). Good mouth care. In the first days, nourishment should be very limited—better yet, complete fasting. During convalescence, careful bland diet.

Dengue.

Light diet with attention to good bowel movement. During convalescence, careful diet.

Pappataci Fever (Summer Fever).

Treatment symptomatic.

Verruga Peruana.

Light, nourishing diet. Arsenic against anemia.

Spotted Fever.

Treatment surgical.

Japanese Inundation Fever (Tsutsuga Mushi Disease).

Liquid, nourishing diet. Therapy up to date unsuccessful.

TROPIC METABOLIC DISEASES.

Beri-beri.

The diet will contain fresh good foods, lots of fresh vegetables, especially cured rice, egg yolks, chopped meat. The Japanese use with great success a special bean (Phaseolus radiatus) three times a day, 50 grams, as vegetable. As extractive substance, Anti-beri-berin, made of rice, has very good effect.

Pellagra.

Symptomatic treatment. Maize food prohibited. Complete change of nourishment. Give meat, milk, vegetables (this disease being due to exclusive maize nourishment).

Sprue.

A careful nourishing diet (milk diet). Milk, fresh, raw and not too rich with the addition of Vichy water, bouillon or weak tea. The amount should be large enough to improve the weight of the patient. If the milk is not easily taken add equal parts of alkaline waters. In cases where acute fermentation and diarrhea occur, start with exclusive protein diet if possible—meat juice, raw meat, pure egg white, bouillon, veal jelly, and after two weeks pass to other forms of diet. Fruit diets are sometimes taken with success, especially strawberries (possibly due to some vitamins). The mouth conditions will be treated symptomatically (mouth wash). Passing to a normal diet we have to take great care, adding, only slowly, eggs, then the more easily digestible flours made of proteins; among meats, chicken, veal and white meats will be chosen; vegetables, except potatoes, are not well taken care of and have to be replaced by puddings, desserts. The sprue patients have to be very careful to prevent gastrointestinal catarrh, and must avoid all the heavy, spicy and rich dishes, ice-cold drinks and alcohol.

SEPSIS.

The nourishment should be sufficient (35 to 40 calories for one kilogram body weight) as the duration of the disease is long. Good mouth hygiene (cleanse tongue with lemon peel). Avoid constipation by adding fruits to the diet or using enemas. In cases of diarrhea, tannalbin or uzara, both medicines acting very promptly.

Alcohol in form of sherry or port, pure or added to desserts as eggnog, different puddings (see Recipes).

In chronic infections the food is of great importance, as in many cases of this kind a good stomach and digestion aid the patient more than he can be aided medically. It is unnecessary to mention the importance of feeding in chronic tubercular infections, as the proper diet is of paramount importance. Among the other chronic infections, such as rheumatic arthritis and arthritis deformans, we use a low calcium diet, as for example: Bread, 100 grams; potatoes, 100 grams; apples, 100 grams; sugar, 500 grams; butter, 50 grams; boiled meat, 250 grams; fish, 100 grams; a diet in which the calcium content is 0.1313, proteins, 80 grams; carbohydrates, 145 grams; fat, 100 grams; total calories, 2000. Patients with arthritis deformans who are obese and flabby will be helped by a diet which will remove the excess of fat.

Malignant Tumors.

Prohibited: alcoholic, spicy and hot foods. The diet used should be the one prescribed for increase of weight. (See Diet for Weight Increase.)

Anaphylaxis.

In most anaphylactic conditions, among which are the skin diseases such as Urticaria, Erythema Gyratum, Quincke Edema (angio-neurotic edema), the protein-free, or -poor diet is indicated.

Helminthiasis (Intestinal Parasites).

On the day previous to the medication the diet plays an important part. A noon luncheon. In the afternoon, one cup bitter coffee. At night, tea and salad. After a high enema next morning, the tapeworm medicine is given on an empty stomach; lemonade or cracked ice will control the nausea. One hour after taking extractum filicis masis (5 to 10 grams, depending upon the age of

the patient), follow with 2 tablespoonfuls of castor oil. The tapeworm will be expelled either spontaneously or through irrigation.

2. DIET IN SKIN DISEASES.

All the skin eruptions accompanying acute infectious diseases during the periods of fever are best treated by the liquid diet which is the most easily digestible. In some cases the restricted milk diet is the most suitable. In the latter stage of an acute illness the non-restricted milk diet is usually the most suitable. All of the diseases of children accompanied by skin eruptions, as scarlet fever, measles, chickenpox, etc., are best treated by liquid diets during the period of fever, continuing this form of diet only if complications arise. Naturally the diet in each individual case must conform to the state of nourishment of the patient.

In acne vulgaris, if not due to colitis, the coarse diet (vegetables, fruits, whole wheat bread) is most suitable, prohibiting all sweets, cheese, seasoned foods and limiting the amount of starchy foods. Carlsbad waters and laxatives are valuable aids to the local treatment. In some cases the milk diet is more suitable.

In eczema, especially arthritic eczema, a protein-poor diet should be employed with the addition of Carlsbad water or Vichy, the local treatment to be prescribed by the attending physician.

In erysipelas, which is an acute infectious disease, the liquid diet is most suitable during the fever period.

In herpes zoster, a skin eruption due to localized neuralgia, the diet must conform to the cause of the neuralgia (diabetes, uric acid diathesis), *i.e.*, a starch-free diet in one case and a protein-poor, or free, in the other case.

In icterus (jaundice), abnormal yellowish skin discoloration due to the occlusion or inflammation of bile-ducts, the fat and protein-free diet should be prescribed for the period of time in which the secretion of gastric juice is low. In all diseases in which the digestion of fats is impaired and where there is almost total anacidity in the stomach, the protein-poor diet is best.

In lupus erythematodes and vulgaris, the diet for weight increase is suitable, because of the poor nutrition and the anemia in those cases.

In cases of psoriasis, thirst days have sometimes a surprising effect. On the whole, however, a starch-poor diet with the lightest and most digestible proteins is far more suitable.

In prurigo, suralimentation with limited amounts of carbohydrates aid in the general treatment.

In pruritus, the diet differs according to the cause of the disease (stomach, diabetes or chlorosis), as a bland diet in cases where the stomach is the cause, starch-free diet where diabetes is the causative factor, and a caloric and iron-rich diet where chlorosis seems to be the main factor.

In scurvy, fruits and fresh vegetables are essential supplements to the normal diet.

In scrofula (tuberculosis of the lymphatic glands), suralimentation with a diet rich in iron and calcium is most suitable.

In urticaria, itching skin eruption due to certain foods, it is advisable to avoid such foods as strawberries, crawfish. lobster, tomatoes and such medicines as aspirin or other salicylic preparations. In many cases only one of the above mentioned substances may provoke urticaria, the patient being entirely unaffected by the others. There seems to have been an increase in the number of cases of urticaria

recently (mostly in older people), due to the different poisonous substances contained in proteins, as meat, fish, cheese, the reaction being of an anaphylactic nature.

In some of the itching skin diseases as the exudative inflammatory processes (eczema, urticaria, prurigo, lichen ruber planus), the irritation of the peripheral sensory nerves is responsible for the skin manifestations. In others, as the metabolic diseases, the organic and functional disturbances of the central nervous system, the changes in the blood and lymph producing apparatus, as well as of the endocrine glands, the skin conditions are due to the underlying enumerated conditions. The hormonal therapy, as thyroid in pruritus, myxedema; insulin in diabetic pruritus, or parathyroid in disturbed calcium metabolism, have proven of great benefit, in addition to the proper diet.

In **neurodermatitis,** as in other urticarial swellings and eczema, an anacid or hypoacid condition of the stomach with secondary incomplete protein digestion has been found to be responsible for the condition. In some cases rectal constipation or stagnation in the large intestine will aid in the resorption of toxic substances or undigested proteins. The great group of alimentary and toxic dermatoses have their cause in changes of the composition of the blood and we will have to class them among the anaphylactic skin manifestations. Here belong also the drug exanthemata of exudative character, also the serum diseases. The dermatoses are produced in all these cases by the action of the antigen in hypersensitive organisms on the antibodies in the peripheral circulatory system, causing changes such as increased transudation or inflammation. The relation found between pruriginous conditions and disturbances of the mineral metabolism and of the chemical composition of the blood indicates that the diet is of first importance in therapy. In eczema the uric acid in the blood was found to exceed 6 milligrams. Metabolic disturbances of the phos-

phates were found responsible for pruriginous diseases. The diet recommended in all these itching dermatoses is protein-poor and the treatment is aimed to combat the protein poisoning. Calcium and urotropin were found to be the best intravenous medications, on the one hand increasing the resistance of the vessel walls and on the other hand destroying the infection agents. The liver being found underactive, pancreon should be added as well as hydrochloric acid to replace the acid in the stomach.

3. DISEASES OF THE MUSCLES.

Among the conditions in which the correct diet is of importance therapeutically must be mentioned muscular rheumatism and the gouty deposits in the muscles (tophi)—conditions requiring a diet low in extractive substances, or a low-protein diet. In some of these cases the pure-milk diet, or alternating fruit and milk days after periods of a low-protein diet, will be most advantageous. A sufficient quantity of fluids (no alcoholic beverages) and mineral alkaline waters, such as Carlsbad and Fachinger, is advisable. In cases of muscular atrophy due to nervous conditions or partial disability after injuries or operations, a diet rich in proteins and carbohydrates aids in the general treatment of massage and electricity.

4. DISEASES OF THE BONES AND JOINTS.

During the acute stages of inflammatory conditions accompanied by fever the liquid diet, and in some cases the pure-milk diet, is most suitable. In chronic inflammatory conditions such as chronic rheumatism, chronic arthritis and conditions accompanied by acute changes in the joints, the low-protein diet, which is also poor in extractive substances, is most advisable. In some diseases of bones as scurvy, osteomalacia (rarefaction of bone), a diet rich in

calcium and phosphorus will aid the general medical treatment. Osteomalacia, caused by a low calcium diet, was a very frequent disease during the war. Previous to that it was recognized only among those suffering from old age, as senile atrophy of the bone, or osteoporosis.

5. DISEASES OF THE NERVOUS SYSTEM.

Generally speaking, in diseases of the nervous system a special diet is not required unless other organs are involved. Then, the diet prescribed must conform with the disease of the particular organ affected. These diets will be described in the proper place.

In neurasthenia a diet rich in lecithin and calcium is advisable. Where there is destruction of nervous substances as in diseases of the spinal cord the more recent view is to give such patients once a day raw nerve materials, such as the brains or spinal cord of calf finely chopped with lemon juice and a little caviar (organotherapy). In addition, vegetables such as celery, raw or cooked, tend to act as a nerve tonic. Eggs contain lecithin and are consequently advisable. Restriction of salt is another form of treatment in uncomplicated nervous diseases.

For nervous diseases caused or accompanied by diabetes see the diet in diabetes. For nervous diseases associated with gout, see the protein-poor or purin-free diet. For nervous diseases associated with gastrointestinal disturbances, see the different diets for gastrointestinal disturbances. A few authors still prescribe a salt-poor or a salt-free diet in the form of the pure or unrestricted milk diet, in cases of hysteria or neurasthenia. Spices and stimulating drinks such as tea, coffee and alcoholic beverages should be avoided.

In epilepsy we give the salt-poor diet with the previously mentioned restrictions (tea, coffee, alcohol).

6. DISEASES OF THE BLOOD.

Chlorosis.

In chlorosis (green-sickness) the foods used should be rich in iron compounds and in calcium. All foods should be fresh, not too salty or too dry (milk, green vegetables, raw meat, calf's liver, beef juice, wines as Madeira and sherry, fruit, etc.).

In obese people with anemia the high-protein diet is most suitable, whereas in delicate individuals suralimentation diet should be employed.

Where gastrointestinal symptoms are present the liquid or semi-solid diet is employed until the symptoms subside.

Sample diet:

(von Noorden.)

Breakfast.	Meat (60 to 90 grams), toast, tea.
10.00 A.M.	Two eggs, butter, toast, 1 glass of milk, a little sherry. Rest 1 hour.
Luncheon.	Meal without soup, no fluids (protein-rich, green vegetables, stewed fruits).
4 o'clock.	Milk or cocoa, butter, toast.
Dinner.	As luncheon.
Bedtime.	One glass of milk, or stewed fruits.

Where symptoms of nephritis exist, liquids and salts must be limited (salt-poor diets).

Secondary Anemia.

As in chronic nephritis we try to remove the underlying cause, following the diet as outlined in chlorosis.

Pernicious Anemia.

Where the gastric secretion is absent a diet low in protein content, unless hydrochloric acid and pepsin medication are given, is most suitable. Iron-containing foods, finely cut meat, fresh fruit, green vegetables, oranges, grape-

fruit and apples are most easily digested. Fresh, raw bone marrow well seasoned is also given with an idea of stimulating blood formation. Fresh or cooked liver.

In *posthemorrhagic anemia* suitable medical or surgical treatment (blood transfusion) is employed. During convalescence the diet is the same as in chlorosis.

Leukemia.

Prescribe a diet rich in proteins with a moderate amount of carbohydrates and green vegetables. When the gums and mouth are in bad condition employ the rich liquid diet (concentrated liquid foods).

Hemophilia (Slow Blood Clotting).

The calcium-rich diet (milk, zoolak, buttermilk, cheese) gelatine in the form of jellies, oatmeal, bread and fresh vegetables are most suitable.

In *purpura hemorrhagica,* which is merely a symptom accompanying severe diseases due to toxins (sepsis, septic nephritis, arthritis and anaphylactic conditions), the diet must be prescribed according to the disease in which purpura appears.

Diet in Deficiency Diseases.—Pathological conditions of the body due to lack of vitamins [certain essential substances in the food described in Chapter I.]

Scurvy, Möller-Barlow's Disease.

Before antiscorbutic substances were known this disease was found wherever persons lived on a too monotonous diet, lacking in fresh substances (as in jails, almshouses, etc.). The pasteurization and sterilization of milk has been known to account for many cases in infants (Hess).

Prophylaxis.—Breast feeding, if possible; if not, raw milk with an addition at an early age of fruit juice (orange juice or tomato juice) to the diet of the infant.

Treatment.—When scurvy is present, prescribe fruit juice, raw milk, mashed potatoes, soup made with carrots, beef juice, broths and potato water (after six months).

In older children, fresh vegetables, fruits such as oranges, limes, lemons and apples, raw meats, will effect a cure.

7. DISEASES OF THE RESPIRATORY APPARATUS.

General Rules.—Acute pulmonary diseases accompanied by fever (pneumonia, for example) require a liquid diet to which alcoholic beverages may be added as the conditions require. In chronic lung conditions, including tuberculosis, suralimentation is essential, with the gradual passage from liquid to bland, and then to the suralimentation diet. In these cases milk, eggs and butter, and all foods enumerated in the chapter on Diet for Increase of Weight may be employed according to the stage of nourishment. Where there is lack of appetite due to the stomach, as is common in pulmonary diseases, the diet must necessarily be poor in proteins and rich in carbohydrates and fats. Where the activity and motility of the stomach musculature is impaired, small and more frequent meals are more suitable.

Acute and Chronic Rhinitis.

Special dietetic treatment not required. In some cases reducing the protein and liquid intake may prove efficient.

Acute Tracheitis, Bronchitis, Chronic Bronchitis.

The usual fever diet. Mineral waters as Ems, Seltzers, diluted with hot milk, are given twice or three times daily, producing easier expectoration.

Asthma Bronchiale or Nervosum.

Alcohol and nicotine prohibited. Proteins in small amount and only the easily digestible ones. Following a

careful skin test, some of the foods may have to be excluded from the diet.

Lobular and Lobar Croupous Pneumonia.

A diet of sufficient caloric value should be administered: Milk soups, bouillon, eggs, zwieback, sometimes finely chopped meat; liquids in sufficient quantity as wine (sherry, port, Bordeaux, champagne) or a small amount of beer.

Tuberculosis of the Lungs.

The nourishment should be of good quality and sufficient quantity, a diet rich in fat and proteins: Meat, milk, eggs, starchy foods, butter, the amount of starch and fats to be proportionate to that of proteins. Some resorts for lung tuberculosis are giving patients great amounts of koumiss or kephyr. The diet for weight increase has to be tried in each case. Beverages: Little wine, beer (malt beer); coffee, tea, cognac, as additions to milk if the pure milk is not agreeable to the patient.

Miliary Tuberculosis, Gangræna Pulmonum, Tumors of the Lungs.

A high caloric liquid diet is advisable.

Pleurisy.

The diseases of the pleura require a liquid diet during the fever period and a high caloric one during convalescence.

8. DISEASES OF THE CIRCULATORY APPARATUS.

Chronic Myocarditis.

The chronic myocarditis cases should have a moderate diet in which the intake of alcoholic beverages is either very limited or completely dispensed with.

Fat people should undergo a reducing cure (a regulated moderate exertion and some mineral water treatment as Carlsbad, Marienbad, Nauheim, or Saratoga Springs). Carbonated waters should be prohibited in these cases.

Idiopathic Heart Hypertrophy.

Idiopathic heart hypertrophy (not due to organic trouble or kidney disease). A mechanic-dietetic treatment of the circulatory disturbances is indicated:

1. Reduction in the body liquids and especially the blood. In reducing the liquids we reduce the quantity of blood in the body and thus ease the heart action. Therefore it is well to limit the intake of liquids, soups, etc. (This is a generalization which does not apply to all cardiac cases, for patients who are thin the intake of liquids does not need quite such an absolute control.)

2. Strengthening the heart muscle and helping the compensation (hypertrophy) by exercise.

3. Improvement of the circulation by massage, passive exercise, CO_2 baths.

Weakness of the Heart.

In primary weakness of the heart muscle, a reduced liquid diet.

Compensated Heart Diseases.

The diet should be well prepared but not too rich; the meals small and more frequent; no spices, coffee, tea or alcohol; no gas forming foods (cabbage, dark bread, legumes, potatoes) or carbonated waters. Reduction in the liquid intake. One hour's rest after meals.

Decompensated Heart Diseases.

Rest in bed. A smooth, light diet. Very little salt.

Hydrops (Following Decompensated Organic Heart Diseases).

The Carrell diet (salt-poor with moderate reduction of the liquid intake; 800 cubic centimeters milk, a few baked, unsalted potatoes daily) is indicated.

Acute Endocarditis.

Liquid diet.

Acute Pericarditis.

Also the liquid diet (with great caution).

Neurosis Cordis.

Alcohol, tea, and coffee, also the gas-forming foods, prohibited.

Paroxysmal Tachycardia.

Same as for Neurosis Cordis.

Fatty Heart (Cor Adiposum).

Reducing diet (small meals; no liquids with the meals).

Arteriosclerosis.

Little meat; no alcohol, nicotine, tea or coffee; no sour foods or raw fruits.

Hypertension (High Blood-pressure).

Hypertension may be present either without known cause (essential) or accompanied by hardening of the arteries. It may be closely associated with the menopause and with kidney diseases. In the latter conditions greater care with regard to the diet is necessary.

Breakfast. Weak tea, milk, buttermilk, sour milk, wheat bread, zwieback, rye bread, honey, butter and cream cheese.

Luncheon. Water or milk soups with legumes or wheat, oat, barley flour, rice, farina, noodles; meat, mostly boiled (no sauces); fresh fish, boiled; potatoes boiled; all fresh vegetables; light

egg dishes; fruits, fresh stewed fruits; puddings with fruit juices, and rice pudding; small glass of water.

Dinner. Like breakfast or luncheon without meat. Meat only twice or three times weekly; slow eating; good mastication.

Prohibited. All spices, large amounts of salt (no more than 5 grams—1 teaspoonful for the whole day). Alcohol, coffee, bouillon, meat extracts, game, liver, kidneys, brains, sweetbreads, fat meats, sour meat dishes, sausages, fish salad, fish mayonnaise, smoked fish, horse-radish, radishes, onions, large amounts of liquids, cheese (except cream cheese).

Angina Pectoris.

Causal therapy in case of gout or syphilis. The diet should be light (see Diet in Hypertension).

Aneurysma Aortæ.

Small quantity of liquids; very little meat; no wines or gas-forming foods.

9. DISEASES OF THE DIGESTIVE APPARATUS.

Stomatitis (Catarrhalis, Ulcerosa and Aphthosa).

Liquid diet is here the food of choice, given either cold or lukewarm.

Care of the Mouth. The teeth should be cleansed with paste or powder followed by a mouth-wash of the following prescription:

℞ Thymoli,		
Saccharini	āā	2.0
Tr. vanillæ,		
Tr. myrrhæ	āā	5.0
Spir. melissæ		200.0
Olei menth. pip.		3.0
Olei cinnamomi		1.0

Sig.: Mouth-wash—a teaspoonful to a glass of hot water.

In pathologic conditions, an antiseptic mouth-wash such as peroxide should be used.

For dry tongue—apply borated glycerin, 1:5.

DISEASES OF THE TONGUE.

Glossitis, Parenchymatosa, Dissecans, Psoriasis Linguæ, Melanotrichia Linguæ.

Ice-cold drinks should be prescribed here.

In noma, parotitis (mumps), angina ludovici, and in diseases of the soft palate and tonsils, a liquid diet should be prescribed. In angina catarrhalis, lacunaris, parenchymatosa, necrotica (Vincent), a cold liquid diet is advisable.

DISEASES OF THE ESOPHAGUS.

Inflammation and distention of the esophagus require a fluid diet. In stenosis it is necessary to employ a stomach tube, using a diet of milk, raw eggs and wine. Also for rectal feeding employ milk and dextrose, soft-boiled eggs, wine, pepsin, pancreas powder or meat pancreas enema. (Leube.)

Prepare as follows:

Finely chopped meat	150 Gm.
Pancreas	50 Gm.
Lukewarm water	100 Gm.

Fifty grams is sufficient for each enema.

In neurosis (œsophagismus) a diet for fluid or rectal feeding as described above is used.

STOMACH DISEASES.

The treatment of stomach diseases is chiefly dietetic, medicines being of secondary importance. In cases where there is a prolonged lack of appetite, bitters have proven of little value. Suitable diet, on the contrary, is of the greatest help.

In the ancient writings of Hippocrates and Galen we find elaborate information concerning the importance of careful feeding. In the middle ages the Arabs gave general advice concerning diet, without paying particular attention to the diseases of the gastrointestinal tract. It was not until the end of the eighteenth century that Sydenham, Boerhave and Fr. Hoffman described the diet to be employed in diseases of the stomach.

During that period many gastrosophic writings were published, the most famous of which was that of Brillat Savarin (Paris at that time was the center for dietetics). It was not until the middle of the nineteenth century that rational dietetic therapy was started. G. V. Liebig with his research work on chemistry and Kussmaul, who studied the digestion of the stomach, and who was the first to use the stomach tube, were the teachers who gave dietetics a place among the modern sciences.

DIETETIC RULES IN STOMACH DISEASE.

A. **Good Mouth Care.**—Thorough mastication is not only important for the digestion of the starches, by increasing the secretion of the salivary gland, but also serves to divide the food into fine particles, thus diminishing the work of the stomach.

B. **Good Care of the Teeth.**—The removal of bad teeth, and the use of a disinfecting mouth-wash for the mucous membranes, all aid in destroying pathogenic germs which might affect the stomach harmfully.

Treatment of chronic catarrhs and suppurations of the mucous membranes of the nose and pharynx will aid in preventing secondary catarrh of the stomach, as well as lack of appetite caused by swallowing these secretions. Proper cleansing of the tongue and removal of diseased tonsils will aid in preventing offensive breath.

Number of Meals.—For most people three meals daily are sufficient. Some take a substantial breakfast, a light luncheon and a heavier dinner; others add a small meal between breakfast and luncheon, and again between luncheon and dinner.

Elderly people prefer a light breakfast and dinner, with a substantial meal in the middle of the day. The most rational way is to eat a large breakfast, a light luncheon and a rich dinner. The distribution of meals for the stomach patient will have to be arranged according to the anomalies of secretion, frequent small meals being taken in cases of gastric atonia and larger and less frequent meals in alimentary hypersecretion.

Another important question is the quantity of fluids to be taken. While for the healthy a moderate amount of fluid will do no harm, in stomach disorders the quantity of liquid taken with meals should be watched. While in cases of hyperacidity liquids will dilute the amount of acid in the stomach and thus be of benefit, in cases of hypo-acidity the intake of water during digestion is prohibited. However, experience shows (Kaufmann) that water does not mix with the foods in the stomach, but flows into the duodenum along the small curvature (on the so-called "water-road").

The temperature of foods and drinks is of great importance. For the healthy as well as for the sick, the temperature of foods should be that of the body, 98° F. While it is not absolutely necessary to use a thermometer in measuring the temperature of the food, it is certainly advisable to avoid too hot and too cold foods in the diet, especially in the diet of the stomach patient.

Should the patient be allowed to walk after meals, or should he recline? In all conditions such as atonia, ptosis of the stomach, the patient should recline after meals. During rest the patient should lie on the right side, as conditions for an easy outflow from the stomach will be better.

In ulcer and dilatation of the stomach, rest after meals is advisable. On the contrary, in habitual vomiting and aërophagia (air swallowing) the patient should sit after meals and not lie down.

Another point in the nourishment of stomach patients is to have their meals served in the most appetizing manner, in order to increase the appetite. We can do more to improve the appetite by a well prepared and arranged menu than through medicines. In this the diet kitchen plays an important part.

Acute Gastritis.

Fasting for two days. Employ a mouth-wash. Clean tongue with lemon juice; give small pieces of ice or cold tea without sugar; carbonated waters. Later, use a liquid diet of ice-cold boiled milk, broths, thick soups with egg yolk. After two days follow with white meat, raw chopped meat, sweetbreads, brains boiled (and later broiled), zwieback. If there is no appetite give stomachics (bitter mixtures). After two weeks a more liberal diet may be allowed, avoiding raw fruits, dark bread and legumes.

Chronic Gastritis.

Employ a mixed diet (proteins, carbohydrates, little fat). At the start use milk dishes (rice, farina), flour soups, eggs, egg dishes, light desserts, chopped meat, chopped ham, mashed potatoes, spinach, carrots. In general, if acidity is diminished, diet should contain more carbohydrates, less proteins and fats. In hyperacidity, proteins and fats should predominate in the diet. In every case of chronic gastritis food should be served in the form of purées to aid digestion. Among the carbohydrates there are the light desserts, milk dishes, thick soups made of rice or oatmeal, puddings of fine flour, zwieback, toast, vegetables in purées (mashed), spinach, carrots, string beans, peas, lettuce, potatoes, chestnuts, cauliflower, lentils,

beans. (Boil one to two hours, pass through sieves, add 15 to 20 grams of butter and a tablespoon of cream.) In anacid gastritis, add spices (meat extracts, salt, finely chopped parsley). Prohibited: Dark bread (graham), foods rich in cellulose, such as raw fruits, mushrooms, cabbage, salads, cucumbers and yeast doughs.

In general in hyperacid gastritis, proteins should be allowed only in purée form, finely chopped, to make digestion easy. Fibrous tissues of the meat will provoke lientery.[1] Prohibited: Steaks, sausages, roast beef, bacon, smoked meats.

Fats.—Fats in anacid gastritis are badly taken care of, so butter, cream and milk (low melting fats) should be used instead.

Liquids.—Mineral waters—Seltzers, Biliner, Saratoga; no alcohol, no coffee.

Prohibited.—Spices, spicy foods, salads, herrings, sausages, cucumbers.

Make meals small, frequent—four to five a day.

Sample diet in subacid and anacid chronic gastritis:

Breakfast.	200 grams milk cocoa.
	40 grams zwieback.
	10 grams butter.
11 A.M.	Two eggs or oatmeal soup made of:
	250 grams broth.
	20 grams oatmeal flour.
	1 egg yolk.
	20 grams butter.
Luncheon.	Broth with one egg yolk.
	150 grams finely chopped chicken or veal, squab, brains, sweetbreads, fish.
	100 grams vegetable purée, light pudding, omelette, soufflée, toast.
Afternoon.	200 grams milk cocoa.
	40 grams zwieback.
	10 grams butter.

1 Passage of undigested food.

Evening. No meat.
One egg yolk or milk dish or purée of stewed fresh fruit, toast, butter.

Sample diet in hyperacid chronic gastritis:

Breakfast. Tea, cream, toast, butter, 2 eggs or 250 grams Yoghurt, toast, butter.

Luncheon. No soup.
100 grams chopped meat, vegetable purée, light pudding, or macaroni, milk toast, mineral water (alkaline).

Afternoon. Same as breakfast.

Dinner. Milk dish, or scrambled eggs, or
100 grams roasted meat, chopped.
100 grams vegetable purée.
20 grams toast.
20 grams butter.
Mineral water.

Gastric Ulcer.

In serious cases of hemorrhage allow no food for three or four days. If thirsty, employ a mouth-wash or enemas. If hungry, employ nutrient enemas. After three days, give a milk diet of cold boiled milk, up to three quarts in twenty-four hours. Second week, allow tapioca in milk. After two weeks, allow meat jelly, eggs, thick soups, milk toast. The fourth week, allow brains, sweetbreads, chicken purée, boiled white meat of chicken, or raw chopped meat, soft boiled rice, mashed potatoes. Fifth week, allow purées of fresh vegetables, mineral waters, Vichy, Biliner. Rest in bed is prescribed for the first fourteen days, later a rest of one hour after each meal. Some authors (Zweig) are very emphatic concerning rest in bed from four to six weeks, but are more liberal concerning diet.

First week: Chiefly milk, about 2 to 3 pints daily with the addition of tapioca, corn starch, Kufeke flour or Sana-

togen (30 to 40 grams daily). Twice daily 50 grams chicken jelly and raw egg yolk, daily adding one until at the end of the week five egg yolks per day are given. The egg yolks are given either raw or mixed with milk. There are patients who cannot stand milk, so it is replaced by oatmeal soups, made of:

Chicken broth	100 Gm.
Oatmeal flour	20 Gm.
Butter	20 Gm.
Egg yolk	1
Thrice daily.	

For thirst: Albumen water (1 white of egg beaten in 200 c.c. of water).

Beverages.—Use the less carbonated mineral waters such as Vichy, Biliner.

Second week: Same diet with the addition of zwieback, 1 to 2 daily. By the end of the week 5 zwieback daily.

Third week: Add purée and chopped chicken, squabs, brains or sweetbreads. Use very little salt. Zwieback and the rest of the diet as in previous week.

Fourth week: Add tenderloin steak or veal (chopped), fish (trout, flounder, halibut, haddock) boiled in water, adding sweet butter before serving it. Vegetable purée and purées of fresh stewed fruits.

Fifth week: Add desserts, omelettes, dry sponge cake, puddings, 2 eggs, rolls (soft part only).

In two months, plain meats.

Prohibited: Raw fruit, legumes, fruit ices, very cold and very hot drinks, alcohol, black coffee, ices, dark bread (such as whole wheat).

Lenhartz' objection to the former diet forms is that the nutrition of the patient suffers and that the healing of ulcers is retarded. He gives a rich protein diet as follows:

First day after hemorrhage: 300 cubic centimeters milk, 2 to 3 beaten egg yolks. Then add 100 cubic centimeters

milk and 1 egg yolk until at the end of the first week 800 cubic centimeters milk and 6 to 8 eggs are reached.

Second week: No increase in the milk quantity (to prevent dilatation of the stomach), but the addition of raw meat, finely chopped, 35 to 70 grams per day.

After two weeks: Soft boiled rice, farina, softened zwieback.

After four weeks: Mixed diet with boiled chicken, fish, avoiding legumes and gas-producing foods. Table follows:

Food	Days After Hemorrhage													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14-28
Eggs	2	3	4	5	6	7	8	8	8	8	8	8	8	8
Sugar			20	20	30	30	40	40	50	50	50	50	50	50
Milk	200	300	400	500	600	700	800	900	1000	1000	1000	1000	1000	1000
Raw meat						35	70	70	70	70	70	70	70	70
Rice Pudding							100	100	200	200	300	300	300	300
Zwieback								20	40	40	60	60	80	100g.
Raw ham										50	50	50	50	50
Butter										20	40	40	40	40
Calories	280	420	637	777	955	1135	1588	1721	2138	2478	2941	2941	3007	3073

Senator uses gelatine, jellies with fruit juices or sugar, milk jellies, fresh butter, cream, almond milk (emulsio amygdalina).

Gastrectasia.

Here the dietetic principles must conform to the degree of the lack of motility and the type of secretory disturbance. The principal thing is to serve the food in a form and amount which will cause the least strain on the stomach muscle. Small but frequent meals should be given in order to prevent the distention of the weak stomach. Regarding the nature of food given, that, and also amount chosen must be in accordance with the type of secretory disturbance. In hyperacid conditions, proteins are to be favored, as meat, chicken, fish, eggs. Carbohydrates are badly taken care of, so must be used only in very fine form as

vegetables in purées, bread in the form of toast or zwieback. Sweets in large amounts are prohibited; fats are also badly digested. Only small amounts of butter and cream should be used. All spices are prohibited.

Differing from this diet is the one employed for cases which in conditions of defective motility have insufficient secretion, as in cancer of the pylorus. Proteins should be given in very small amount, and only in finely ground meat purées, fish, brains, sweetbreads. Carbohydrates are very useful here in the form of thick soups, puddings, purées of vegetables. In anacidity fats are badly digested. The main thing in cases of ectasia is to serve foods in semi-liquid form. The amount of liquids in twenty-four hours should not exceed 1000 to 1500 grams, including milk, cream, beef tea, thick soups. All carbonated waters are prohibited. In case of thirst, pieces of ice, iced milk or iced coffee serve best. An example of a diet in gastric ectasia with hyperacidity follows.

Breakfast.	250 grams milk toast.
	3 zwieback.
	One egg.
10 A.M.	70 grams chicken or beefsteak.
	20 grams toast.
1 P.M.	100 grams veal, fish, or chicken.
	50 grams vegetable purée.
	30 grams toast.
	150 grams milk with
	30 grams Sanatogen.
5 P.M.	2 eggs.
	20 grams toast.
8 P.M.	100 grams beefsteak.
	30 grams toast.
	150 grams milk.
10 P.M.	250 grams milk with
	30 grams Sanatogen.

Example of a diet for gastrectasia with achylia:

Breakfast.	250 grams milk. 30 grams toast.
10 A.M.	2 eggs. 20 grams toast.
12 Noon.	Flour soups with one egg.
2 P.M.	100 grams chicken or sweetbreads or brains or fish. 50 grams vegetable purée. 20 grams toast. 100 grams milk.
4 P.M.	250 grams milk cocoa. 2 zwieback.
6 P.M.	Tapioca pudding (250 grams milk, 20 grams tapioca, 15 grams sugar).
8 P.M.	50 grams meat purée. 2 eggs (omelette). 10 grams butter. 10 grams sugar. 20 grams toast.
10 P.M.	150 grams milk with 30 grams Sanatogen.

Cancer of the Stomach.

The diet should be prescribed according to the disturbance of the stomach functions. The peptic function is impaired from the beginning, and we have to contend with the disturbances subsequent to the lack of gastric juice with a normal motility. The diet to be employed is the same as in achylia gastrica (lack of acid). When the cancer involves the stomach muscle or pylorus, we will have the ectatic condition to contend with, and the diet to be followed is the one of gastrectasia. Use frequent small meals. Foods should be tasty. Among the proteins we choose chicken, fish, finely chopped veal, brains, sweetbreads or

protein substitutes. Carbohydrates are given in the form of legumes, flour soups, vegetable purées, honey and malt extract. Fats in small amounts of fresh butter or cream. Other food, milk (with coffee, tea or cognac), sour milk, kephyr, yoghurt. Toasted white bread, zwieback, desserts, omelettes, puddings, fresh stewed fruits, fruits in purées. Drinks: tea, coffee, alcoholic beverages.

An example of diet in cancer of the stomach with motor disturbance (Zweig).

Mornings.	¼ liter milk. 40 grams toast. 20 grams butter.
10 A.M.	Oatmeal soups with one egg yolk.
Luncheon.	Thick soup with one egg yolk. 150 grams roast chicken, veal or fish. Vegetable purée. Purée of fresh stewed fruits.
Afternoon.	Glass of milk or cocoa. 20 grams zwieback. 20 grams butter.
Dinner.	Tapioca pudding (250 grams milk, 20 grams tapioca, 50 grams sugar).
Or:	
	2 eggs. 20 grams toast. 20 grams butter. 1 glass wine.
10 P.M.	Glass milk.

Gastric Ptosis.

Reduce fluids. Allow no drinking during meals. Diet should be easily digestible, with meals small and more frequent. The diet should be one of suralimentation in order to obtain an increase in the fatty tissue of the abdomen,

and through it an improvement in the condition of the stomach. The patient should rest in bed after meals in a horizontal position. Other helpful measures are massage, hydro- and electrotherapy, and the wearing of a belt.

Gastralgia.

Treatment of the etiologic factor. Symptomatic treatment of the gastric disturbances, for aërophagia (nervous belching). In case of vomiting give cracked ice.

Pyrosis (Heartburn).

Avoid foods causing fermentation. Treatment of the causative factor.

Hypersecretion and Hyperacidity.

Prohibited: Skins and seeds of vegetables and fruits, spices, alcohols, smoked meats, smoked preserved meats, game, sauces.

Reduce carbohydrates on account of their diminished digestibility because of the increased hydrochloric acid in the stomach.

Cakes, toast, zwieback, vegetable purées, butter, cream, milk, eggs, light white meat, chopped beef, alkaline waters are allowed. (See Diet for Gastric Ulcer, third week.)

Achylia Gastrica (Anacidity).

The protein digestion being very poor, meats should be given only in purée form (fish, chicken, calf brains); carbohydrates, as vegetable purées, toast, zwieback; fats, only in form of butter, cream. Alcohol in small amounts. Example of a simple diet in anacidity:

Breakfast.	250 grams milk cocoa.
	30 grams zwieback.
	20 grams butter.
10 A.M.	Oatmeal.
	Soup with one egg yolk.
	20 grams toast.
	20 grams butter.
Luncheon.	Soup of legumes with 1 egg yolk.
	100 grams meat purée.
	100 grams vegetable purée.
	Egg soufflée or milk dishes.
4 P.M.	200 grams milk.
	20 grams toast.
	Two eggs.
Dinner.	Vegetable purée with one egg yolk.
	30 grams toast.
	20 grams gervais.
	200 grams milk.

Nervous Dyspepsia (Neurasthenia Gastrica).

No rigid diet is necessary, but the patient should be urged to use a normal diet, with carbohydrates and fats predominating.

Chronic Gastrogenous Intestinal Dyspepsia.

Diagnosis is made from stool examination. The condition is due to lack of stomach secretion.

Prohibited: Raw, half-done or seasoned meats.

Allowed: Vegetables in purée form, fish well-cooked.

Proteins, fats and carbohydrates can be used in the diet as long as their preparation is such as to make them easily digestible. The qualitative arrangement of the diet will depend upon the findings from the daily stool examination. If stools show muscle fibers or putrefaction, the diet employed should be one low in protein (eggs and meat). Should the stools show undigested starch and fermentation, the diet must be poor in carbohydrates. Light proteins

(meat purées), jellies, eggs, bouillon, fruit jellies, red wine, tea, little sugar, will be given.

Fermentative Intestinal Dyspepsia.

Prohibited: All carbohydrates.

The protein-fat diet prescribed is even stricter than in diabetes, due to the exclusion of salads and raw vegetables allowed in diabetes. Small amounts of milk, sugar or dextrose are allowed. An example of this diet follows:

First breakfast.	Tea or coffee (Haag) with milk or cream. 2 soft boiled eggs. 2 lumps of sugar. 2 teaspoonfuls of fruit jelly.
Second breakfast.	Bouillon with egg, finely chopped ham.
Luncheon.	Clear broth, fish with butter or tenderloin steak (plain).
Afternoon.	Same as breakfast; no eggs.
Evening.	Cold chicken, plain veal cutlet with butter, omelette soufflée (no flour), with fruit jelly, wine or tea.

After several days of stools free from fermentation and starch, add carbohydrates gradually; sugar, fine wheat flour, finest corn flour, rice flour, arrowroot, farina, zwieback, toast, tapioca, noodles, rice, white bread, potatoes and legume purées, vegetable purées, stewed fruits in purées. Tough vegetables, raw vegetables and fruits are prohibited, as well as alcoholic beverages, beer.

Dyspeptic Diarrhea in Morbus Basedowii.

In Basedow's disease (exophthalmic goiter) fatty and watery stools occur. Attention to the proper medical and surgical treatment of the disease. The diet is the same generally as prescribed for such conditions in diseases of the pancreas. Pancreon and calcium carbonate will help the fat-poor diet.

Nervous Dyspepsia and Diarrhea.

Treat the nervous system. Diet is not so important.

Enteritis and Colitis (Acuta and Chronica).

Acute Enterocolitis: Fast 24 to 36 hours. Then allow hot tea, water, cocoa, rice water, emulsio amygdalina (almond milk), oatmeal, or barley soup (butter, salt and a little sugar). No milk or very little with rice, tapioca, cocoa, farina. Instead of milk use water, broth or red wine to prevent fermentation. Later, add proteins: beef tea, meat jellies, egg white, gelatine, boiled chicken, or squab; then follow with eggs and meat dishes.

Chronic Enterocolitis: The diet must conform to the conditions of fermentation or putrefaction (after careful inspection of the stools). As long as diarrhea persists, the diet will be the one used in the acute stage; the most easily assimilated foods, such as tea, broth, red wine, sugar, thick soups, farina, egg white and jellies (meat or wine jelly), toast and a few cakes. After the inflammation subsides, add boiled rice, light egg dishes, finely chopped meat, fruit jellies and desserts from the finest flour.

Further, if through the microscopic stool examination conditions of putrefaction are seen to be present, use carbohydrates, prohibiting eggs, meats. If fermentation occurs, a strict protein diet will be advisable. The foods should be served warm, finely prepared, and chopped, without spices. Meats, eggs, butter, fish (fresh only), purées of light vegetables (cauliflower, spinach, carrots), fresh stewed fruits in purées, milk in small, gradually increasing amounts.

Prohibited: Fresh bread, foods rich in cellulose, yeast doughs, all salads, fresh fruits, nuts.

Acute Colitis.

The diet is not so important as in acute gastroenterocolitis, as digestion occurs mostly in the small intestines.

The first day, use tea, cocoa, thick soups, and avoid all food rich in cellulose, as cellulose digestion takes place chiefly in the cecum. As soon as the stool proves to be free of pathological food residues, a more normal diet may replace the strict one.

Chronic Mucous Colitis.

There are two different opinions regarding this condition. Lenhartz and von Noorden recommend a diet rich in cellulose (vegetarian), the object being to cure constipation. Ad. Schmidt and Boas use a bland diet to prevent colon irritation. A diet rich in "roughage," through the stagnation in the cecum (production of gas and fatty acids through bacterial influences), has an irritative influence on the mucous membrane, also increasing the peristaltic activity. In my experience, with the exception of some cases where the nervous condition predominates over the organic changes, a carefully selected smooth diet has always proven of great advantage. Outside of the dietetic treatment, care should be taken to obtain a normal daily evacuation, through such measures as the attending physician may find opportune, such as medicines, massage or irrigations, usual colonic or subaqueous intestinal baths.

Perityphlitis.

During the acute stage, up to the disappearance of fever and pains the liquid diet is advisable. In persistent vomiting several days of fasting will help the rest of the treatment; frequent mouth-wash to check the thirst. After disappearance of the acute symptoms: meat purée soups, potato purée, calf brains, sweetbreads.

Physics prohibited; after 3 to 5 days, colonic irrigations.

Acute General Peritonitis.

Treatment of a perforative peritonitis is mainly surgical. The fibrinous purulent peritonitis requires in the acute

stage complete fasting, then liquid diet. In tubercular peritonitis a very nourishing diet should be prescribed. Proteins to be added gradually, giving hydrochloric acid after meals.

10. LIVER AND GALL-BLADDER DISEASES.

Icterus Catarrhalis (Jaundice).

First of all, treatment of the gastroenteritis. No fats. A purely milk diet in the beginning, then meat purée soups, thick soups, potato purée, vegetable purée, light puddings, white bread, cakes. No alcohol. As beverages: Water, milk, coffee and milk, mineral waters (Carlsbad, Ems).

In *acute liver diseases,* with fever the liquid diet is indicated. Where glycosuria is present a diet poor in starch and controlled, as in diabetes, by certain restrictions regarding the fats, is most advisable. Alcoholic beverages, all fats except butter, spices and meat extracts are prohibited.

In acute inflammatory stages of *gall-bladder diseases,* as cholecystitis and cholelithiasis, the liquid diet, for the most part the pure milk diet, may be prescribed until the acute symptoms subside. The diet poor in proteins and extractives may also be used. No raw fruits or vegetables are allowed. Meats should be boiled or broiled and vegetables mashed. Desserts, stewed fruits and butter allowed.

Cholelithiasis.

The meals should be three hours apart, small in quantity but good in quality and well masticated. At night one glass of milk. Cold drinks prohibited. Reduction of liquids in accompanying gastroptosis. The diet is similar to the one in gastrointestinal disturbances. In cases with hyperacidity, we prohibit all spices, cold drinks, raw fruits, fresh rolls, strong coffee and sweets. In hypoacid or an-

acid cases a lactovegetarian diet is most suitable. Butter allowed.

Prohibited: Fat dishes, fatty sauces, smoked meats, fish.

Cholecystitis Infectiosa (Cholangitis).

In the first week of the disease the patient should be given a pure milk diet, then a lactovegetarian diet, adding meat purées only in the third week.

Cirrhosis Hepatitis.

Same diet as in chronic gastroenteritis.

In atrophic cirrhosis of the liver, alcohol should be allowed in small amounts, complete abstinence being rather harmful. Fats should be used according to the individual tolerance.

11. DISEASES OF THE PANCREAS.

Inflammations of the pancreas, due to gall-bladder diseases, cause disturbances of fat digestion (steatorrhea), while those secondary to stomach diseases cause disturbances of the protein digestion. In the former case, fatty stools (or steatorrhea) are present; in the latter, undigested proteins (creatorrhea) are passed. (Diagnosis from stool examination.)

Acute and Chronic Pancreatitis.

The main therapeutic agent is the diet.

Fats, on account of steatorrhea, are prohibited or allowed only in emulsions (for instance, almond milk).

Foods allowed are milk, butter, as much as necessary in the preparation of meats. If creatorrhea is present, a reduction in the quantity of meat in the diet is necessary and should be given only as finely chopped meat or purées, soft boiled eggs, meat jelly or Erepton (Gross).

Carbohydrates: Sugar, fine flour, tapioca, rice farina, fine bread, mashed potatoes, vegetables (caution!) only as purées.

Carbonated waters prohibited. Wine in small amount.

In cases of secondary intestinal catarrh, the diet should be watched much more closely.

In necrosis, apoplexy, abscess, pancreas stones, cysts, and carcinoma, the treatment is mainly surgical and the dietary regulations have little influence, but during convalescence they should be determined by the remaining predominating symptoms. The diet as described in chronic pancreatitis will be found the most useful.

THE DIET IN DIABETES.

Of late it has been discovered that diabetes is due to lack of function of the islands of Langerhans in the pancreas, which normally produce an internal secretion—a hormone—which is poured into the blood and aids in the complete metabolism and digestion of starch. A diminution or absence of this secretion results in an impaired digestion of starch, increase in the blood sugar and elimination of sugar in the urine. In the past the treatment was purely dietetic, withdrawing all starchy foods from the diet and also restricting proteins in the more severe cases (as proteins in too large an amount change to starch and then to sugar during metabolism). Drugs such as opium and codeine were formerly prescribed, and other medicines such as aspirin or powdered pancreon, pansecretin or pancretin were employed to reduce the glycosuria. More recently the discovery by two Canadian physicians of insulin, an extract of the islands of Langerhans (for hypodermic use only), has enabled us to increase the tolerance of the patient for carbohydrates.

After the study of hundreds of cases, we have found insulin to be a powerful help in the treatment of diabetes. Its use makes possible an enriched diet, containing enough carbohydrates to make it palatable, allowing the patient to increase in weight and strength and to improve his meta-

bolism by eliminating the dangers of acidosis. Insulin has, also, to a certain extent, curative properties, as it increases the carbohydrate tolerance.

Although this epochal discovery has made the treatment of diabetes very much easier, dietetic measures are still of the very greatest importance.

The dietetic method has passed through many changes, all of which, however, have aimed at an improvement of the sugar-balance. There is no "best method." All the different dietetic treatments used in the past hundred years, carrying the names of the doctors advocating them, may be very good in one case and yet perhaps dangerous in another, so the attending physician must choose for each individual case the method that proves best.

Since the dietitian does not do schematic work, he tries to find the proper diet corresponding to the metabolic stage of the individual case (in view of having sugar and acetone reduced to zero, and still assure the optimum of body strength).

He must determine the tolerance of the patient; that is, he must find out the amount of carbohydrates the patient can ingest without eliminating sugar in the urine. The amount of protein and fat best suited to the needs of the patient must be found. The proper balancing of different combinations of food is very important and different in nearly every case. Fixed formulas for proteins and carbohydrates, as one part of nitrogen to five parts of carbohydrates, are not commonly used in practice.

It is necessary to arrange a diet which may reduce the irritability of the sugar producing system, thus increasing the tolerance of the patient for starches. A careful diet employed over a long period will improve the activity of the pancreas. This, however, is not always possible, for instance in severe cases with much acetone in the urine.

Diabetic cases may be classified as light, middle-severe and severe. The light and middle-severe may be controlled by dietetic means (see chapter under Special Diets), but when the general physical conditions are poor (under-nourishment due to tuberculosis, gastro-intestinal conditions, anemia, etc.), and the carbohydrate tolerance is not sufficient to allow a high caloric, properly arranged diet (fats, 2 grams; carbohydrates, 1¼ grams; proteins, 1 gram per 1 kilogram body weight), we will need insulin to control the necessary level in the metabolic rate, to keep the urine sugar-free, and the blood-sugar as near to the normal level as possible.

In the severe cases of diabetes, also in the previously mentioned middle-severe cases requiring weight increase, the insulin should be given two or three times daily, before the meals containing the amount of carbohydrates allowed for the day. The dose should correspond to the sugar eliminated: 1 unit per 1½ grams urine sugar of the daily output; *i.e.,* 45 grams sugar are eliminated in 24 hours, 30 units of insulin will be required to make the urine sugar-free; or we add one unit per 2 grams carbohydrates over the tolerance level.

How to Determine the Tolerance and the Type of a Diabetic Case.—When the diagnosis of diabetes has been made, the question of how to determine the severity of the disease arises. We try first to stop the sugar elimination through a severe (carbohydrate-free) diet. Then we add gradually carbohydrates to the diet, in the form of white bread (20 grams each day) or equivalent until the sugar reappears in the urine, at which point we have reached the tolerance level. The amount of the tolerance, the resistance to proteins (*i.e.,* the sugar-production by adding greater amounts of protein), and the relation to acetone formation, together give a picture of the severity of the diabetic case in question. Strictly speaking, tolerance con-

sists of the carbohydrate tolerance and the caloric tolerance (the diabetic, contrary to the healthy person, is not able to take care of any amounts of fats).

While the light cases can easily be made sugar-free without confining the patient, the middle-severe and severe cases belong in hospitals and sanitariums for clinical observation. In the latter, the withdrawal of carbohydrates from the diet is the first step. The most radical method for freeing urine of sugar, outside of insulin, is the fast day (rest in bed, and giving only bouillon, coffee, tea, 100 cubic centimeters brandy, and eventually bromides), or in a milder form, the vegetable days (see Vegetable Days). Often one to two vegetable days are sufficient to make the urine sugar-free. Fast days are prescribed only for well-nourished people. Diet must be restricted slowly for more delicate patients, even if a longer time is required for the desired result.

The restricted diet is composed of all kinds of meat, eggs, milk, cheese as proteins; green vegetables, fats, alcohol in small amount. Even without the green vegetables the diet is not absolutely carbohydrate free, as all meats contain small amounts of glycogen.

The reduction in protein is the first principle, contrary to the practice in former times. Ingestion of meat should be limited to 500 grams (Naunyn) or to a like quantity of meat preparations, cheese, or eggs (1 egg equals 6 grams protein or 20 grams meat); (150 grams fish or chicken equals 100 grams meat; in 500 grams meat there are 130 to 140 grams proteins). In the more severe cases the reduction should reach 250 grams meat or equivalent.

High Protein Diet:

250 Gm. meat	=	75 Gm. proteins
100 " "	=	20 " "
50 " cheese	=	15 " "
5 eggs	=	30 " "
500 Gm. meat	=	140 Gm. proteins

Low Protein Diet:

100 Gm. meat	=	25 Gm. proteins
75 " "	=	18 " "
25 " cheese	=	8 " "
4 eggs	=	24 " "
250 Gm. meat	=	75 Gm. proteins

Fats.—The use of the necessary amount of fat in the diabetic diet is a difficult task (150 to 200 grams fat daily from which 100 to 125 are used in vegetables). All fats are calorically equal, one part butter can be exchanged for olive oil. Pure bacon contains 90 per cent. fat, good cream, 30 per cent. fat.

Alcohol.—Its use in the restricted diet is quite important on account of the high caloric value (1 gram equals 7.1 calories); it makes the use of fats easier and acts as a tonic, also against ketonuria (acidosis).

Vegetables, Salads, Fruits.—Vegetables allow us to use in their preparation a certain amount of fat; they also aid peristaltic activity; 200 grams vegetables with butter, 100 grams salad, form a part of the standard diet. In some cases with small tolerance for bread a larger quantity of vegetables should be given. The carbohydrate value of vegetables varies from 6 per cent. to 8 per cent. according to kind, season and preparation.

With the restricted diet, to prevent coma, bicarbonate of soda may be given as follows: 20 grams in the light cases, 30 to 40 grams in the serious ones, daily. Insulin in such cases is extremely valuable. The restricted diet will be given for weeks and months, in some of the serious cases with the reduction of proteins to 300 or 250 grams meat (or its equivalent) one day every two weeks; one vegetable day per week. On the fast day (see Special Diets) a large amount of liquids (tea, wine, lemonades, broths) should be given (von Noorden). Vegetable days have the advantage that no loss of body fat or only a slight loss of

body proteins occurs (see Vegetable Diet). The longer the carbohydrate addition is under the tolerance level, the more will assimilation improve, thus increasing the tolerance.

The diet system as described here, I have used before the Insulin era and found it practical in the ambulant treatment of diabetics. The diabetic patient, independent of age, length and seriousness of the disease, is first put on a starch-free diet with a reduction in the quantity of meat, plus 100 grams of white bread, for a period of three days, the caloric value corresponding to the weight of the patient. During this period the urine is saved in separate specimens of both day and night, and routine sugar, acetone and ammonia determinations are made. The blood sugar determination is advisable before and after starting this test diet, the test being made in all cases in the morning before breakfast. The starch-free diet employed is arranged as follows:

Breakfast. Tea or coffee, sweetened with saccharine or crystallose, cream, butter, 25 grams of white bread, or roll, two soft boiled eggs, ½ grapefruit.

Luncheon. Beef or chicken broth, 150 grams any kind of meat, boiled, fried, roasted or broiled but not breaded. Starch-free vegetables, spinach, string beans, cabbage, lettuce, artichokes, tomatoes, cauliflower, salad (with vinegar and oil or lemon juice), tomatoes, endives, water cress, cucumbers, lettuce, 50 grams white bread, cheese, butter, ½ pint of red wine (Bordeaux).

Afternoon. Same as breakfast—25 grams white bread.

Dinner. 100 grams meat, vegetables as mentioned above, salad, stewed fruit, sweetened with crystallose, cheese, butter, 25 grams bread, desserts for diabetics (see Recipes).

If the urine of the third day is sugar free, the 100 grams of white bread were tolerated and the patient is able to

stand more carbohydrates. This case is classed as a light one. To the same standard diet is added 20 grams of white bread daily or its equivalent in other starch-containing foods (see von Noorden Table) until the first trace of sugar appears. This indicates the point of tolerance for starch and we must arrange a diet containing about 30 grams of carbohydrate-containing foods less than this amount. Under such a diet the blood sugar may decrease to normal and the sugar-producing system will have a further opportunity to recuperate. If the 100 grams of white bread produced sugar in the urine we use starch-free diet giving a practically starch-free bread in the form of air bread (gluten bread, Heudebert, Park and Tilford). This bread although not tasty gives a base for butter and satisfies the patient to some extent.

Such cases must be classed as serious because they have practically no tolerance for carbohydrates. If the diet with air bread continues to produce sugar in the urine the protein amount given in the form of meat, eggs and cheese must be reduced. The same starch-free diet then contains only 150 grams of meat, 50 grams of cheese and four eggs daily, in addition to the allowed vegetables and other foodstuffs previously mentioned in the diet (between 75 and 100 grams of protein daily).

Fish (Oatmeal) Days.—The purpose of this diet is to replace proteins, as meat, by fish, withdrawing cream, cheese and fruit, but adding oatmeal (60 grams a day). Where there is acetone formation the diet may be arranged as follows:

Breakfast. Tea with lemon, or black coffee, butter,* air bread, two soft boiled eggs or sardines.

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* Butter in diabetic diet should always be freshly washed before each meal in cold water, as low fatty acids, which are mixed with butter, are a source of acetone and fortunately dissolve in water.

Luncheon. Broth with egg yolk, or addition of 30 grams oatmeal, if required, as oatmeal soup. Fish 150 grams boiled, fried or broiled with the allowed vegetables (Table I, Diabetic Diet), salads, wine chaudeau as dessert, sweetened with crystallose (see Recipes, Chapter VIII).

Dinner. Same as luncheon (100 grams of fish, air bread, one pint red wine, Bordeaux).

The caloric value of the diet must be determined in each case by the desirability for increasing or decreasing the weight. The amount of alcohol and butter prescribed depends upon the necessity for increasing or decreasing the caloric value.

Vegetable-Egg Day.—If fish days do not make the urine sugar free, we prescribe a more restricted diet. On one day at certain intervals the diet is limited to five egg yolks, all allowed vegetables, butter, coffee, tea, red wine, air bread, and meatless bacon. An example of this diet form follows:

Breakfast. Black coffee, tea with lemon, two soft boiled eggs or bacon and eggs, butter, and air bread.

Luncheon. Broth or bouillon with egg, egg dish with allowed vegetables, or fried bacon with cabbage, asparagus or artichokes or cauliflower with sauce Hollandaise and wine chaudeau.

Afternoon tea. Same as breakfast.

Dinner. Same as luncheon, using the amount of butter and eggs in all forms with all the allowed vegetables. Wine up to a pint (prescribed or prohibited in every individual case, as necessary).

Where the above diet form does not make the urine sugar free, we employ the pure vegetable diet in which only vegetables, butter, coffee, tea, wine and air bread are allowed. This is a diet very low in calories for only severe cases, as a forerunner to an even more restricted form in which fasting plays a part. Where there is increased output of acetone under this strict dietary treatment we must pass to the pure oatmeal days immediately preceding the fast day.

Briefly we use three days of the standard diet with 100 grams of white bread, two or three days of the restricted diet with only air bread, one or two restricted days with reduced protein intake, two or three vegetable-egg days, one purely vegetable day, or one fast day, two or three oatmeal days, again two or three vegetable-egg days, one day of restricted diet with reduced protein intake, two days of restricted diet as in the beginning, then gradually add carbohydrates in the form of bread or similar food till the patient's tolerance level is reached. This system, used during observation in hospitals, will be changed after a complete study of the tolerance and general condition of the patient to a less complicated form, in which a less strenuous variation of diet forms will be given.

Blood sugar and urine examinations give us an indication as to how often restricted dietary menus should be employed. The physician in charge has to deal not only with the metabolic processes, but also with the general condition of the patient, mental as well as physical. We must warn against overfeeding. F. M. Allen has shown how necessary a reduction in the quantity of calories is in the diet of the diabetic. During the war the lack of food in Europe showed how its reduction influenced glycosuria and acetonuria.

In the normal diabetic diet give only 1 to 1.2 grams of proteins for each kilogram of body weight. The urine should

not contain more than 16 to 17 centigrams of nitrogen for each kilogram of body weight. Fat diabetics should be brought to normal weight by reduction of fat in the diet, and delicate patients kept at the same weight, increasing it gradually in very severe cases. Too rapid suralimentation should be avoided. For a short period all diabetics, even the most delicate, bear underfeeding quite well. The need of a diet richer in calories depends upon the amount of muscular work done.

The Dietetic Treatment of Diabetic Coma.—The whole aim in the diabetic therapy is the avoidance of coma. If the best care still does not prevent it, there is very little that we can do to prolong life. In the beginning coma, the patient should be put to bed and his stomach washed out. No food, but alcohol and water (about 150 to 200 cubic centimeters of whisky or cognac) should be given. This with the usual alkaline therapy is the most rational method of procedure. Two to four fast days are usually ordered, with special care and stimulation of the heart. Food should be added very slowly. The proper use of insulin will prevent coma, and if given at once it may save patients already showing coma symptoms.

Here are four Tables by von Noorden, the first enumerating the foods allowed in the starch-free diet; the second giving the list of foods of high caloric value; the third giving a list of foods conditionally allowed and prescribed, and the fourth giving the list of equivalents for wheat bread.

Mosenthal planned the next Table giving 5 forms of diabetic diets from 496 to 2345 calories daily (very useful in ambulatory treatment), and 3 acidosis diets from 242 to 723 calories daily.

TABLE I (von Noorden).

Foods which may be taken by any person suffering from diabetes.

Fresh Meats.—All muscle parts of the ox, cow, calf, pig, sheep, horse, game, domestic and wild birds, either roasted, boiled, or broiled, in their juice, with butter, with mayonnaise without flour, or any sauce without flour; either hot or cold.

Inner Parts of Animals.—Tongue, heart, lights, brain, sweetbreads, kidneys, marrow; liver of calf, game or poultry (paté de foie gras) up to 100 grams in weight, and weighed after being prepared.

Extremities of Animals.—Feet, ears, snouts, tails of all edible animals.

Preserved Meat.—Smoked meat, dried meat, smoked or pickled tongue, ham, bacon, smoked breast of goose, Australian corned beef, sausage (pure, containing no bread), brawn, "ox-mouth" salad.

Meat peptones of all kinds, jellies and aspics prepared from calves' feet or pure gelatine; Somatose, Sanatogen, Nutrose, Eucasin, Tropon, Plasmon, Roborat, Glidin, rice-albumen, wheat-gluten, etc.

Fresh Fish.—All fresh fish (sea or fresh water), boiled, fried, or grilled. If the fish is fried in breadcrumbs and eggs, the crust should be removed before the fish is eaten. All sauces not containing flour are allowed; those containing butter and lemon are the best.

Preserved Fish.—Dried, salted and smoked, such as haddock, cod, herring, mackerel, flounder, sturgeon, salmon, sprat, eel, etc. Pickled herring, sardines in oil, mackerel in oil, anchovy, pilchard, tuna fish, etc.

Fish Products.—Caviar, codliver oil.

Shellfish and Crustacea.—Oysters, mussels, and other shellfish, lobsters, crabs, crawfish, shrimps, prawns, turtle, etc.

Prepared Sauces for Meat and Fish.—All well known English sauces, or piquant sauces, prepared in the English style: Beefsteak, Harvey's, Worcestershire, Anchovy, Lobster, Shrimp, Indian Soy, China Soy, etc. These sauces may be taken in small quantities unless especially prohibited.

Eggs.—All birds' eggs, either raw or cooked, but without flour.

Fats.—All fats of animal or vegetable origin, *viz.*, bacon, butter, lard, dripping, goose fat, olive oil, sesame oil, salad oil, margarine, cocoa butter, laureol, sana, ceres, palmin.

Cream.—Fresh, rich cream is allowed in any quantity up to three-tenths of a liter per day, when there is no special limit given. In the preparation of foods and sauces cream is allowed and should be made use of in any quantity, as the use of cream for many meat dishes, fish, vegetables, and egg preparations makes flour superfluous. Cream is one of the most important foods for diabetics.

Cheese.—All kinds, especially cream cheese, up to 50 grams per day.

Fresh Vegetables.

Salads.—Cabbage, lettuce, curled and smooth endive, romaine, cress, dandelion, purslain.

Flavoring Herbs.—Parsley, tarragon, dill, borabe, pimperal, mint, leek, garlic, celery leaves.

Vegetable Fruits.—Cucumbers, gherkins, tomatoes, French beans with young kernels, vegetable marrow, egg plants, melanzane, suchette.

Bulbs.—Onions, young turnips, as long as they are green, radishes, horseradish.

Stalks.—White and green asparagus, hop buds, English celery, Brussels sprouts, chicory, young rhubarb stalks.

Blossoms.—Cauliflower, broccoli, Brussels sprouts and artichokes.

Fresh Vegetables.—Spinach, sorrel, curled cabbage, Savoy cabbage, white cabbage, red cabbage, butter cabbage, mangelwurzel.

Mushrooms.—Fresh champignons, stone mushrooms, egg mushrooms, morels, truffles in the usual quantities.

Nuts as follows: 6 walnuts, 10 hazel-nuts or 10 almonds or 8 Brazil nuts, or 10 peanuts.

Fruit.—Of stewed fruits only the following are allowed in any quantity: cranberries, unripe gooseberries, and young rhubarb stalks preserved with saccharine or crystallose instead of sugar.

Preserved Vegetables.—Asparagus, string beans, French beans, pickled gherkins, mixed pickles, cucumbers, olives, champignons, and preserved vegetables of the above groups.

Condiments.—Salt, black and white pepper, Cayenne pepper, curry, paprika, cinnamon, cloves, nutmeg, English mustard, saffron, aniseed, carraway seed, bay leaf, capers, vinegar, lemon.

Soups.—Broth of any kind of meat, or made of meat extract with the addition of green vegetables, eggs, pieces of meat, bone marrow, fish, crustacea, balls of meat or liver, Parmesan cheese, and other substances mentioned in this table.

Sweets.—Made from eggs, cream, almonds, lemon, gelatine, prepared with saccharine or crystallose instead of sugar.

Beverages.—All kinds of natural mineral waters or artificial carbonated waters.

Good brands of cognac, rum, whiskey, rye, brandy, gin, etc. Light Rhine wine and Moselle, tested with regard to sugar, also Burgundy, Bordeaux and sparkling wines not containing sugar.

Tea and coffee, with cream and saccharine or crystallose, instead of sugar.

Twenty grams of cocoa for diabetics are allowed.

Lemonade with water or Seltzer water sweetened with saccharine, crystallose, or pure glycerine, in some instances levulose.

TABLE II (von Noorden).

Foods characterized by their high nutritive value and prescribed for the use of persons suffering from diabetes.

Fats.—Butter, bacon, lard, goose drippings, meat drippings, oils of all kinds, codliver oil.

Dairy Products.—Fresh and sour cream, all kinds of cheese, especially cream cheese.

Meat Dishes.—The nutritive value of meats rises according to their percentage of fat. Fat pork and mutton are, therefore, more nutritious than lean beef or veal.

Sausages and Smoked Foods.—Those made from pork possess the highest nutritive value. Sausages made solely of pork are the most nutritious.

Fish.—River eels and salmon, smoked salt water eel, smoked salmon and mackerel possess the highest nutritive value.

Eggs.—All eggs are nutritious, especially the yolk which is seven times as nutritious as an equal quantity of white. Caviar is also very nutritious.

TABLE III (von Noorden).

Foods, which, if not absolutely forbidden, should be allowed only in small quantities. In cases where a restricted diet is prescribed, they must be entirely avoided.

Vegetables (cooked without flour or sugar).—Dried haricot beans, dried yellow or marrowfat peas, either whole or as purée.

White turnips, carrots, salsify, stacys, fresh or preserved green peas, broad beans, kidney beans with large kernels as vegetable or salad—2 tablespoonfuls.

Wild raspberries, blackberries—2 tablespoonfuls.

Whortleberries—3 tablespoonfuls.

Stewed fruit (without sugar, but with saccharine or crystallose).—Mirabelles, damsons, plums, apples, pears, apricots, peaches, sour cherries—1 heaped tablespoonful.

Raspberries, red currants—2 heaped tablespoonfuls.

Dried Fruit.—Plums, apple chips, peaches, etc., well soaked before cooking—2 heaped tablespoonfuls.

Levulose chocolate—up to 15 grams.

Cocoa without sugar—15 grams.

TABLE IV (von Noorden).

Foodstuffs which are rich in carbohydrates. When a "Restricted Diet" is prescribed they are prohibited. When not on a restricted diet, the patient may use them, but only in certain prescribed quantities. The quantity allowed must be fixed by the medical adviser in each case and for a certain period.

Wheat bread is taken as a guide, and in this table particulars are given as to the weights of various foodstuffs, which are equivalent to certain weights of wheat bread. We call it, therefore:

Table of Equivalents for Wheat Bread.

Wheat Bread.	10 Gm.	15 Gm.	20 Gm.	30 Gm.	40 Gm.	50 Gm.
Rye bread, Aleuronat biscuits, Graham bread, "Pumpernickel"	12	18	24	36	48	60
Aleuronat bread	12	22	30	45	60	75
Gericke's porter biscuits	15	18	24	36	48	60
Fromm's conglutin biscuits	15	18	24	36	48	60
Pure cocoa	20	30	40	60	80	100
Stollwerck's acorn cocoa	12	18	24	36	48	60
Stollwerck's levulose chocolate.	10	15	20	30	40	50
Rademenn's cocoa for diabetics.	25	37	50			
Natural Flour:						
Wheat, barley, rye, oats, corn (Indian), millet	7.5	11	15	22	30	37
Buckwheat, beans, peas, lentils.	10	15	20	30	40	50
Starch Farinas:						
Of potatoes, wheat, tapioca, rice, sago, maizena, Mondamin	7	11	14	21	24	35
Farinaceous Products:						
Vermicelli, macaroni, "Grunekern"	7.5	11	15	22	30	37
Cereals:						
Oats	10	15	20	30	40	50
Barley and rice	9	13	18	27	36	45

TABLE IV—*Continued.*

Wheat Bread.	10 Gm.	15 Gm.	20 Gm.	30 Gm.	40 Gm.	50 Gm.
Legumes:						
Peas, lentils, beans (dry)	12	18	24	36	48	60
Peas, beans, broad beans, (fresh, peeled)	20	30	40	60	80	100
Bulbs:						
Potatoes	30	45	60	90	120	150
Chervilroots	21	30	42	60	80	100
Salsify	90	180	270			
Carrots	90	180	270			
Celery	50	74	100	150		
Beetroots	45	67	90			
Fresh Fruits:						
Sweet cherries and mulberries .	50	75	100	150	200	250
Sour cherries, apples, pears and pineapples	60	90	120	180	240	300
Damsons, red currants	75	110	150	225	300	375
Ripe gooseberries	75	110	150	225	300	375
Strawberries	85	130	170	250	340	425
Apricots and peaches	100	150	200	300	400	
Raspberries and blackberries ..	120	180	240	360	480	
"Mirabelles," round European plums, greengages, blackberries	150	225	300	450	600	
Oranges and melons (weighed in their skins)	160	240	320	480	640	
Grapefruit (weighed in their skins)	250	375	500			
Fruits preserved in their own juices and without sugar. Various kinds. The juice must not be used	150	225	300	450	600	750
Fruits from which the sugar has been extracted. Various kinds	250	375	500			
Milk, etc.:						
New milk	135	200	270	400	540	
Sour milk	150	225	300	450	600	
"Kefir"	240	360	480	720	960	
Gartner's "Diabetes" milk	500	750	1000	1500	2000	
Ordinary good cream	150	225	300	450	600	
Sterilized cream (specially concentrated)	200	300	400	600	800	
Beer:						
Pale Rhenish beer	200	300	400	600	800	
Pilsner beer	170	250	340	500	680	
Bavarian beer	150	225	300	450	600	

TABLE V (MOSENTHAL).

Diabetic Diet.	Diet in Grams. Carbo-hydrate.	Protein.	Fat.	Calories.	Meals.	Vegetables. 3% Carbo-hydrate.	Vegetables. 10% Carbo-hydrate.	Vegetables. 20% Carbo-hydrate.	Fruit. 10% Carbo-hydrate.	Cereals. 10% Carbo-hydrate.	Meat and Fish 20% Fat.	Fish 3% Fat.	Butter.	Cream 20%.	Eggs.	Olive oil.	Bread.	Bacon, Cooked.	Milk.	Skimmed Milk.	Gelatine.	Fruit. 20% Carbo-hydrate.
1					Breakfast				10					30								
	20	15	35	469	Lunch	200							12									
					Supper	200					45		12									
2					Breakfast				100	100			15	60								
	40	30	70	938	Lunch	100	90						15									
					Supper	200					100		15									
3					Breakfast				100	100			15	60								
	60	45	105	1407	Lunch	100	90				120		15	30		15						
					Supper	200							15	30	50		30					
4					Breakfast				100	100			20	60	50			30				
	80	60	140	1876	Lunch	100			100		100		20	30		15	30					
					Supper	100		100					20	30	100							
5					Breakfast				100	100			30	60	50			30				
	100	75	175	2345	Lunch	100			100		100		20	30		15	30					
					Supper	100		100			100		30	30			30		200			
Acidosis Diet. 1					Breakfast	100														100		
	20	30	4	242	Lunch	100						100										
					Supper	100														100		
2					Breakfast				100	100										200		
	60	45	5	477	Lunch	100						100								100		
					Supper				120											200	80	
3					Breakfast					100										200		100
	100	65	5	723	Lunch	100		100				100								100		
					Supper			100				75								200	80	

TABLE V—*Continued.*

Vegetables and Fruits. 3% Carbohydrate, 1% Protein.	Vegetables, Fruits and Cereals, 1% Carbohydrate, 1% Protein.	Vegetables, Fruits and Cereals, 20% Carbohydrate, 3 % Protein.	Meat and Fish. 20% Protein, 20% Fat.	Fish. 20% Protein, 3% Fat.	Foods without Food Value.
Artichokes, canned	Beets	Artichokes, fresh	Beef, boiled	Bass, black	May be taken as desired.
Asparagus	Carrots	Beans, baked	Beef, corned	Bass, sea	Agar-agar
Beans, string	Dandelion green	Beans, baked, canned	Beef kidney	Bass, striped	Broth, skimmed
Beans, wax	Green peas, canned	Corn, green	Beef, roast	Blue fish	Clear coffee
Beet greens	Horseradish	Corn, green, canned	Beef steak	Cod fish, fresh	Clear tea
Brussels sprouts	Okra	Green peas, fresh	Beef tongue	Cod fish, salt	Cocoa shells
Cabbage	Olives, green	Lima beans	Capon	Flounder	Cracked cocoa
Cauliflower	Onions	Macaroni, cooked	Chicken, broilers	Haddock	Mineral oil
Celery	Parsnips	Potatoes	Chicken, fowl	Halibut	Starch-free bran biscuits
Cucumbers	Squash	Rice, boiled	Duck	Perch, yellow	Starch-free bran cereal
Eggplant	Turnip	Apricots	Goose	Pollock	Thrice boiled vegetables
Endive	Apples	Bananas	Guinea hen	Porgy	
Kohlrabi	Blackberries	Blueberries	Ham	Shad roe	
Leeks	Cranberries	Cherries	Lamb chops	Smelt	
Lettuce	Currants	Huckleberries	Lamb, roast	Trout	
Marrow	Gooseberries	Nectarines	Mutton chops	Weakfish	
Mushrooms	Grapefruit, edible part	Pears	Pork chops	Whitefish	
Olives, ripe	Lemons	Plums	Pork, roast		
Pickles	Muskmelon		Squab		
Radishes	Oranges		Turkey		
Sauerkraut	Peaches		Butter fish		
Sorrel	Pineapple		Eels		
Spinach	Raspberries		Halibut, smoked		
Swiss chard	Strawberries		Herring, smoked		
Tomatoes	Watermelon		Mackerel, fresh		
Water cress	Farina, boiled		Mackerel, salt		
Rhubarb	Oatmeal, boiled		Salmon, canned		
			Salmon, fresh		
			Sardines, canned		
			Shad		

Weight equivalents:

30 grams = 1 ounce.

1 egg weighs 50 grams.

Household measures:

1 level teaspoonful = 5 grams.

1 flat tablespoonful = 15 grams.

1 heaping tablespoonful, cut meat or fish = 30 grams.

1 water-glass full = 250 grams.

THE INSULIN TREATMENT.

Since 1889, when J. V. Mehring and O. Minkowski discovered the experimental pancreas diabetes, pancreatic extracts of all kinds have been used in the treatment of diabetes, but unsuccessfully. The difficulty in obtaining an efficient extract was due to the fact that during preparation, the real hormone of the Langerhans islands was destroyed by the proteolytic ferments of the pancreas gland. To avoid this, C. H. Best and F. G. Banting in the McLeod's Institute, Toronto, Canada, produced watery extracts from atrophied dog pancreases, in which the secretory ducts had been ligated. These protein-poor and non-toxic extracts had all the expected effects on the sugar metabolism, being as efficient as the real pancreas hormone. Soon the discoverers were able to produce efficient extracts from the whole pancreas of cattle, and thus to use it on a large scale in the treatment of diabetic patients. The mentioned authors are the *real founders of the hormone therapy in diabetes.*

Insulin is a complex protein derivative; it allows us to replace the lack of hormone in diabetes, and to facilitate a substitution therapy in diabetes equal to the value of the thyroid gland in myxedema (a therapy which has been successful for the past thirty years). Since the general acceptance of insulin (1923), it has been the most precious help in controlling severe cases of diabetes; in avoiding acidosis (coma); in saving the patient with the already manifest acid poisoning (coma); in allowing us to enrich the caloric and quantitative value of the patient's diet, thus to reach a good state of nutrition. It is indispensable where the old methods are not successful, very desirable where the diet should be handled with less severity.

Dosage.—Twenty to 40 units daily in middle-severe cases up to 100 units in severe cases. Large doses, as 300 units in coma. The best time for administration is 15 minutes

before meals. Where small amounts are needed the necessary carbohydrates are added to the meal which is preceded by the whole amount of the daily dose of insulin. Where the patient objects to the frequent use of the hypodermic needle, alternating carbohydrate-free diet with the diet plus insulin days will allow the rest desired. In severe cases the sudden withdrawal of insulin is not without danger, especially in those cases which have passed through the first stage of coma, in which the acetone bodies would rise parallel with sugar production.

Indications.—In light cases (F. Umber), the advisability of insulin to relieve the hormonal apparatus is indicated, but even more so in acute infections or previous to operations, especially where the blood sugar (before breakfast) shows an excess of 160 milligrams. In hypertonia and where the carbohydrate tolerance diminishes gradually (infantile diabetes); in cases where the carbohydrate tolerance nears 100 grams white bread, or is under this level; in middle-severe and severe cases where acetone reappears through the reduction of the carbohydrates, insulin is of the greatest value. While we cannot replace the diet forms which help as such the diabetic metabolism (meat, fish, egg, vegetable, oatmeal days) with insulin, we will, in most of the cases, be allowed to add 100 grams bread or equivalent to the diet and still keep urine sugar and acetone free. Insulin slows up the loss of tolerance. In very severe cases glycosuria and acetonuria cannot be completely checked, although reduced through a severe diet; such will need doses of 120 to 180 units daily. The most urgent indication for insulin is the beginning of the developed coma.

Diet Under Insulin Treatment.—Under the insulin treatment dietetic rules are to be observed even more carefully than under the exclusively dietetic treatment. We distinguish between the preparatory diet previous to the ad-

ministration of insulin, the one at the beginning of the insulin treatment (by which we coordinate diet and dosage of insulin), and the standard diet under insulin protection.

(1) In every insulin-diet treatment we attempt to reach a tolerance of 80 to 100 grams carbohydrates. The findings of urine sugar, acetone, and blood-sugar under such a diet (80 grams proteins and 100 grams carbohydrates) will show in a few days a constant level. Naturally, if glycosuria or acetonuria or both are high, we give a fast day, which helps the subsequent insulin-diet treatment, and also in determining the most suitable insulin dosage in the particular case.

(2) Diet improvement under insulin administration: After the fast day, the diet will be increased gradually and proportionally with carbohydrates, proteins, and fats. Every third day will be carbohydrate-free, adding proteins in the form of meat, fish, eggs, vegetables, salads, and a little fat. These protein-rich days are welcome to most patients, and the urine will, in the middle-severe cases, become sugar-free under the diet alone, or with the addition of half of the insulin amount used on the previous day.

The first dose of 15 units will be given before dinner of the day after the fast day, then, corresponding to the findings in the urine and the blood, the daily amount of insulin will be divided into two portions to be given before the meals which contain the carbohydrate diet additions. Urine examinations at eight-hour periods will indicate whether or not the corresponding insulin dose was sufficient. Blood sugar determinations will guard against the hypoglycemic reaction (trembling, perspiration, cramps, loss of consciousness) in our insulin dosage.

Light Cases.—Under small insulin doses (20 to 30 units daily), with a diet of average caloric value, and with 75 grams proteins and 60 to 100 grams carbohydrates, the

urine remains sugar-free, the acetone decreases, and the blood sugar nears normal level. The additional carbohydrates, if tolerated in the form of fruits, will be divided between breakfast and dinner, with insulin before both those meals. Every third day, a carbohydrate-free diet and no insulin.

Severe cases are those in which, with the previously mentioned insulin doses and diet, the urine still contains sugar, and also even on the carbohydrate-free days. If only one urine specimen contains sugar, an increase of the corresponding insulin dose will be sufficient to overcome it.

If even a slight glycosuria is continuous, a third insulin injection will be necessary (before luncheon). The amount for this third injection will depend on the result of at least an eight-day test, to prevent sugar elimination on a certain quantitative and qualitative diet. Systematically foods are added until the required patient's optimal diet is reached; if sugar appears, the insulin will be increased until an eight- to ten-day control proves the urine, in every specimen, sugar-free. The alternating carbohydrate-free protein-rich diet weekly will add to the success of the treatment and improve the general condition. It is very important to watch the acetonuria. If, during the insulin-diet regime, the acetone bodies are not decreasing satisfactorily, one to three pure carbohydrate days (oatmeal or rice fruit days) and small doses of insulin, then one fast day (both diet forms accompanied by rest in bed). Insulin 10 or 20 units daily, will be advisable. The effect on the acetone bodies will be quick and permanent. Three to four days later we may return to the former mixed diet plus insulin.

When time for hospital observation is limited in which the determination of the tolerance and type of future standard diet under insulin protection may be made, we order in adults, a caloric sufficient diet of: carbohydrates 100, fats 175, proteins 75 grams for two days and make on the first and

third days, acetone, urine, and blood-sugar examinations. The third day insulin is added before the three meals in an amount corresponding to the sugar output in twenty-four hours (1 unit per each 1½ grams of urine sugar eliminated). This caloric-rich diet is continued for the next few days, adding or reducing the insulin until the urine is sugar and acetone free and the blood-sugar returns to normal level. After the hospital care, if 30 units are sufficient as addition to the mentioned diet, divide the carbohydrate amount between breakfast and dinner, when the patient is at home and more able to give himself the insulin hypodermic.

(3) Permanent Diet: In severe diabetic cases it takes two to three weeks for complete coordination between diet and insulin dosage, and this coordination cannot be perfect before the amount of insulin is tried out with the permanent diet. The permanent diet is calculated as follows: 30 to 35 calories and 1 gram protein per 1 kilogram body weight; the carbohydrates should reach at least 80 to 100 grams. The insulin will vary from 20 to 80 units daily, corresponding to the case. A caloric-sufficient diet with at least 80 to 100 grams carbohydrates and moderate doses of insulin (30 to 40 units daily), is preferable to a low caloric diet with less or no insulin. The permanent diet should have variety and be appetizingly and attractively prepared. Larger amounts of carbohydrates should share with restricted proteins and a normal amount of fats. The protein-rich days should be carbohydrate-poor. If fats are restricted then protein and carbohydrate amounts will have to be augmented. The patients, if well-balanced in diet and insulin dosage during the preparatory diet period, will feel well and strong and free from any danger. We will here also attempt to have two insulin-free or insulin-restricted days, depending on the severity of the case. In very severe cases and in diabetes of children, the insulin-

free days may prove impossible on account of the acetonuria going up together with the glycosuria, and the danger of coma. In these cases we will hardly be able to do without insulin, in spite of the gradually improving carbohydrate tolerance.

12. GENITO-URINARY APPARATUS.

Acute Glomerulonephritis.

The treatment varies according to the etiologic cause (malaria, syphilis, acute or focal infection). The diet should be bland, avoiding substances irritating to the kidney. The kidney activity encounters the greatest difficulty in a high protein diet due to the fact that the residue, for the greater part, is eliminated through the kidneys. Carbohydrates and fats, because their oxidation products leave the body by other ways, are of practically no harm. Many foods contain stimulating substances (spices), which are harmful to the kidneys. Too restricted a diet may lead to undernourishment, secondary heart weakness, great loss of weight and appetite; on the other hand, overfeeding of the bed patient may endanger the heart action by increasing the body weight. The foods of greatest interest in the treatment of acute nephritis are:

1. **Water.**—The amount should not exceed 1000 cubic centimeters. In oliguria normal amounts, and larger quantities in good diuresis with no retention in the tissues.

2. **Mineral Salts.**—Among the salts the phosphates and sulphates need no reduction except in the maximum degree of oliguria. Sodium carbonate—lately bicarbonate of soda—has been recommended for reducing the albumen. Sodium bromide has proved to be harmless.

The intake of salt (sodium chloride) should be watched very closely on account of the relationship between salt

retention and hydrops. The diet should not contain more than 2½ grams of salt daily, where there is diminished salt elimination. In less pronounced cases we can go up to 5 grams per day (see Low-salt Diet).

3. **Milk, Milk Derivatives, Meats, Eggs.**—The proteins should be kept at the lowest level of the diet of the healthy (50 to 60 grams daily). At the beginning of the disease, in bad cases with oliguria, uremic symptoms, or increased urea nitrogen of the blood, we even go below that level, prescribing the low protein days. In a nephritic diet the milk protein is less harmful than the egg protein, the latter less harmful than the meat. Milk should be given, 1 to 1½ quarts daily, part of the amount replaced by cream, koumiss or kephyr. No cheese! The eggs more in the form of egg yolk; no raw eggs. Of meats, only the easily digestible and boiled are indicated. The vegetable proteins are of great value in cases where decided protein reduction of the diet is necessary. Where the complete protein-free diet is required we give fruit ice, sugar water, lemonades, tea, apple sauce, flour soups. During convalescence we increase the proteins of the diet only gradually, meats being in the smaller percentage compared to the other proteins, never over 100 grams.

4. **Starchy Foods, Fruits, Vegetables, Desserts, Salads and Vegetable Spices.**—Bread, zwieback and cakes should be prepared salt free. The same principle should be observed in the preparation of vegetables, salads and sauces. All the spices used in raw vegetables and salads, such as pepper, mustard, onions, garlic, horseradish, radishes, and parsley because of their kidney irritating substances should all be prohibited. Asparagus is accepted by some authors, prohibited by others. Lately it was proved that tomatoes and spinach are not harmful for the kidney, unless they are given in very great amounts, but dill, parsley

and mushrooms, especially if eaten in large quantity are injurious. Potatoes, beets, string beans, cauliflower, also rice dishes, are found completely harmless. Soups made of rice, farina, tapioca; puddings of rice, farina, tapioca; different starchy foods as noodles, macaroni, puddings may be given. Among fruits, cherries, prunes, strawberries, apples, oranges, pears, grapes, bananas, dates, also compotes and fruit juices (apple, apple juice, orange, grapes, raspberry, lemon) may be used freely in the diet of nephritis. Honey and fruit marmalades are allowed, also cinnamon as a spice for puddings and desserts. Vinegar is not absolutely prohibited in its use for salads, and olive oil may be used with safety.

5. **Coffee, Tea, Cocoa, Chocolate, Alcohol.**—Neither coffee, tea, cocoa nor chocolate have kidney-injuring properties, so they are certainly allowed, unless contraindicated by the condition of the heart or nervous system. In nervous and heart conditions caffeine-free coffee will take the place of coffee. In weakness of the heart, strong coffee is necessary.

Alcohol if allowed is only in very small amounts, but in practice it is looked upon as unnecessary and not given to the patient except as a heart stimulant.

In acute nephritis the diet is now adapted to the particular requirements of each patient, consideration being given to the degree of insufficiency and the stage of the disease. The bland diet has been modified as above described, thus making it more palatable and giving it more variation.

Chronic Glomerulonephritis.

(*a*) With nephritic symptoms. Reduction of salt (2 grams daily). Control of intake of liquids.

Prohibited: Sea fish, broth, cheese, milk, for having too high salt content.

(*b*) With uremic symptoms. Low protein diet (avoid meats). Liquids normal. Salt reduction if edema is present. Where retinitis occurs, we reduce the proteins and the fats.

(*c*) Hypertension. Reduction of meat in the diet.

(*d*) Without renal insufficiency. Low-salt and protein diet. Prohibited: All the kidney irritating substances.

Nephrosclerosis.

1. In arteriosclerosis with nephritic symptoms, treatment of the arterial process is indicated.

2. Hypertension (see Diet in Hypertension).

Nephrolithiasis (Kidney Stones).

(*a*) Uric Acid. The diet should be vegetarian. Meats reduced. Avoid purin bodies, as sweetbreads, brains, kidney, liver, spleen. Boiled meat (muscles) allowed. Game, smoked fish, shell-fish, mushrooms, spices, sauces, broths, meat extracts prohibited.

Allowed: Carbohydrates, fats, milk, eggs, so long as they do not disturb the digestive organs, and fresh fruits. Liquids in large amounts. Wines prohibited. Coffee, tea and cocoa only in small amounts.

Urea. Citric acid and glycerin given by mouth are of great benefit.

(*b*) Oxaluria. This condition is due to the presence of calcium oxalate in the urine, a substance more easily dissolved in an acid urine containing a sufficient quantity of magnesia, in the presence of small quantities of calcium.

The treatment should attempt to decrease the acidity of the urine by giving bicarbonate of soda, mineral waters with little calcium, and neutralizing the hydrochloric acid of the stomach with magnesium carbonate. Among foods, avoid those rich in calcium, as milk, eggs, fresh vegetables.

(*c*) Lithiasis Phosphaturica. Use mineral waters — Fachinger, Wildunger. Little meat. Broths, milk, milk dishes, vegetables, starchy foods, sugar. Fruits, sour foods or vinegar should not be allowed.

Pyelitis and Pyelonephritis.

Same diet as in chronic nephritis.

Ren Mobile (Floating Kidney).

Give diet for weight increase.

Acute Cystitis.

A liquid diet is recommended. Milk, lemonades, weak tea. Mineral waters, as Wildunger, Seltzer, Giesshubl.

Chronic Cystitis.

Smooth diet and mineral waters, as Ems, Biliner, Preblau, Carlsbad.

13. METABOLIC DISEASES.

Diabetes.

(See Diseases of the Pancreas.)

Cystinuria.

The proteins in the diet should be reduced to 60 grams proteins daily.

Alkaptonuria.

The diet should contain about 0.7 to 0.8 grams protein per kilogram body weight. Large amount of liquids.

Diabetes Insipidus.

Syphilitic etiology, specific treatment. In other cases salt-poor diet with sufficient fats and carbohydrates.

Gout.

We choose here a diet which lowers the uric acid level in the blood as much as possible, and give purin-free or purin-

poor diet for months. A meatless diet is only a purin-poor diet, as spinach, peas, lentils, mushrooms, also oysters, shell fish, fish, contain a certain quantity of purin bodies (see Table). As for diabetes we advise a more restricted diet over a long period of time, so that the fermentative apparatus of the nuclein metabolism may have a chance to recover.

Tolerance Determination.—After several days of a purin-free diet we give once 200 to 400 grams meat and watch when the endogenous uric acid elimination returns to the former level.[1] The purin-poor diet will contain reduced amounts of proteins (15 to 20 per cent. of the caloric value) as eggs, milk, cheese. Fats are free. Carbohydrates: Fruits, vegetables; among fruits, grapes are prohibited. As beverages, lemonades and mineral waters such as Ems, Fachingen; no alcoholic beverages.

Example of a diet for gout, the caloric value of which can be changed by adding or restricting the butter, cream, and bacon.

Breakfast.	Caffeine-free coffee.
	50 grams cream.
	100 grams milk.
	150 grams white bread.
	25 to 50 grams butter.
	Honey, fruit jelly.
10 A.M.	2 eggs or 50 to 100 grams cheese.
	50 grams white bread.
	25 grams butter.
Luncheon.	100 grams thick soup.
	No broths.
	150 grams potatoes.
	150 grams green vegetables.
	200 grams pudding.
	50 to 100 grams butter.

[1] The number of days required to eliminate the uric acid corresponding to that amount of meat, before returning to the level held during the purin-free diet.

4 P.M.	Caffeine-free coffee with milk or cream and zwieback. 25 to 50 grams butter. Marmalade.
Dinner.	Omelette with marmalade or scrambled eggs or rice pudding with fruit sauce. 100 grams white bread. 25 grams butter. 50 grams cheese. 100 grams fruit.

Beverages: Seltzer water or Wildunger. The purin-free diet should be given two or three months with fish and no meat during eight weeks. Afterwards twice a week 150 grams meat. No liver, kidney, sweetbreads, lungs or brains.

PURIN BASE QUANTITIES IN SOME FOODS (HESSE).

Proteins 100 Gm.	Uric Acid.
Sweetbreads	1.308
Liver	0.372
Kidney	0.320
Brains	0.233
Beef meat	0.175
Mutton	0.189
Veal	0.178
Pork	0.181
Chicken	0.186
Deer	0.182
Pigeon	0.154
Trout	0.213
Salmon	0.201
Pike	2.222
Flounder	0.137
Caviar	0.110
Oyster	0.217
Milk	0.010
Eggs	....
Vegetables, etc.	
String beans	Traces
Carrots	0.007
Potatoes	0.019

Proteins 100 Gm.	Uric Acid.
Asparagus	0.057
Cauliflower	0.078
Green peas	0.079
White beans	0.098
Pea flour	0.108
Wheat flour	0.116
Rye flour	0.096

SAND AND URINARY CALCULI.

Phosphaturia.

Von Noorden recommends reduction of liquids. No eggs. The diet is composed of bread, legumes, and little meat.

Oxaluria.

Allowed: Fats. Carbohydrates. Cheese.

Prohibited: Spinach, rhubarb, potatoes, red beets, figs, beans, celery, string beans, tomatoes, endives, prunes, strawberries, gooseberries, cocoa, strong tea, chocolate. Foods containing oxalic acid in smaller amounts: Bread, flours, apples, sweetbreads, liver, spleen, lungs, muscle. Beverages: Apollinaris, Giesshubl, coffee.

Uraturia.

Purin-poor or purin-free diet recommended. Increase diuresis by reducing the acid reaction of the urine. In some cases, a diet of potatoes is indicated.

Cystinuria.

(See above.)

Obesity.

(See Reducing Diet, among Special Diets.)

INTERNAL SECRETION.

Cretinism and Myxedema.

Treated successfully with thyroid.

Tetany.

Treatment surgical. Transplantation of the parathyroid gland.

DISEASES OF THE DUCTLESS GLANDS.

In these diseases the diet plays an important rôle. If glycosuria accompanies a case of acromegaly or exophthalmic goiter the diet must be arranged according to the requirements of the individual. A stimulating diet will prove very disastrous in cases of exophthalmic goiter. In acromegaly a full mixed diet without excess of carbohydrates, combined with the pituitary and thyroid glands, is most suitable.

ADDISON'S DISEASE.

Due to loss of adrenal secretion there is a general lack of tone in the entire vascular and glandular systems with subsequent asthenia and loss of weight. When gastric disturbances are present it is well to prescribe the same as for acute gastritis. If there is diarrhea, the diet for intestinal catarrh or chronic diarrhea is useful. If there is merely depressed digestion with loss of appetite we must give foods which are simple, nourishing and as concentrated as possible. Foods that increase the thyroid secretion are advisable, also thyroid extract given in small doses. In order to protect the intestinal canal from irritation it is necessary that the food in addition to being simple, concentrated and nourishing, should be soft and non-irritating, without gristle, skins, seeds or any cellulose. Mild stimulants to digestion may be given in small quantities, as bitters, tonics, or a glass of sherry or port.

In thyroiditis due to acute infection, stimulants such as meat soups, meat products, or milk should be avoided and the blandest sort of foods should be prescribed. If the swelling persists the same diet as that prescribed for exophthalmic goiter should be employed.

In the treatment of **exophthalmic goiter** the diet must be prescribed in accordance with a few important principles. All stimulating foods and beverages must be avoided. Furthermore, a diet in which protein putrefaction is lessened by the addition of fats and carbohydrates is advisable. In this way the patients are made to gain weight. All meat products, as well as oysters, clams, and lobsters are prohibited, and the ingestion of eggs should also be limited. Liberal use should be made of fermented milk, as buttermilk; bread crusts; dry cereals, with the exception of oatmeal; vegetables, except peas, tomatoes, beets, turnips, carrots, spinach and asparagus, and cooked fruits with the exception of raspberries and strawberries. Vegetables most suitable are potatoes and string beans. Fat poultry or fish should not be allowed. Fruits containing iodine should be avoided. The milk of goats in which the thyroid gland has been extirpated has been used to advantage because of the low iodine content. Alcohol should be prohibited. The daily protein intake should not exceed 90 grams. When glycosuria is found it is necessary to reduce the intake of sugar, and in some cases, of carbohydrates. In cases where diarrhea is present a considerable reduction in the fat intake is necessary and the addition of pancreon and carbonate of calcium will prove of benefit in combating it.

Professor Balint (Budapest) prohibits foods containing tryptophan (which the body converts into thyroxin, the secretion of the thyroid gland). This dietetic treatment must be used in all cases of hyperthyroidism. The foods allowed are cornflour, vegetables, fruits, bacon, butter, fats, egg yolk, honey, sugar. Prohibited: Cheese, meats, white of egg, wheat flour, milk.

In diseases due to diminished or absent thyroid secretion (myxedema) all that is necessary is to give the patient thyroid gland (dry extract). Diet plays but little

part. However, it is advisable to prescribe all the thyroid stimulating foods such as meat and meat products, oily fish and other foods which have been found to have a high iodine content.

CHAPTER VII.

SPECIAL DIETS.

1. FAST DAYS.

Fast days are of importance chiefly in the treatment of diabetes, especially in cases with no tolerance for carbohydrates and with pronounced acidosis. While some authors advise three to five days in succession from the beginning in treating a serious diabetic case, others use them only at intervals between days of restricted diet (4 to 6 such days a month). By their use we succeed in making most diabetics sugar free and many of them acetone free also. The carrying out of the strictly fast days presents some difficulty in the private home, much less in sanitariums.

A. Cantani was the first to introduce fast days in the treatment of diabetes. If a carbohydrate-free diet, continued for four weeks, was not successful in making the patient sugar free, he starved him for twenty-four hours, allowing only water and fat beef broth. Later he allowed one-half the previous amount of food, slowly increasing to the original quantity.

Naunyn considers these fast days of paramount importance in the treatment of diabetes.

Von Noorden introduced the so-called vegetable days with the same good results, although in more recent years it has been his custom to recommend fast days, especially in the pre-coma stage. F. Kanngiesser recommends taking the last meal at four o'clock in the afternoon for the duration of one month, with the idea of allowing the liver sixteen hours of rest. This is certainly not equivalent to a full fast as recommended by von Noorden (fasting

from eight o'clock in the evening of one day, until one o'clock in the afternoon of the day after next, *i.e.,* forty-one hours). The patient prefers to have one to two cups of tea for breakfast and then one cup of broth at eleven o'clock in the morning, resting from 8 P.M. to 1 P.M. of the next day, making a total of seventeen hours.

M. Guelpa recommends frequent fast days with purging (bitter water or Pluto water) between days of a lacto-vegetable diet. Severe cases of diabetes are harmed by strong physics.

F. M. Allen has worked out a systematic fast-day treatment and very gradually increased the diet without taking into consideration too much the loss of weight.

H. A. Christian stresses the economic value of fast days, for by making the patient sugar free as soon as possible, the period of observation in the hospital is considerably reduced.

The too rigid starvation treatment, which Allen and Christian consider the best, is not approved by von Noorden for the following reasons:

It is of advantage to determine the real state of metabolism of a patient. One must first determine the amount of food the patient is able to stand. This is accomplished by reducing the food to a point where the urine is sugar free. The experienced man is able to determine from the degree of reduction in sugar to what extent metabolism is disturbed, and will make his prognosis accordingly. Furthermore, better results are obtained if sugar-producing foods are gradually reduced. Moreover, only if reduction in the amount of carbohydrates, or a complete restriction of carbohydrates with a protein-poor diet fails, should one employ fast days. Fast days followed or preceded by oatmeal days are very efficient.

The success of immediate fasting in threatened coma is sometimes remarkable. Rest in bed is absolutely necessary

during the fast days. There should be no excitement or mental fatigue; peace of mind and good sleep are very desirable. If the sleep is disturbed 0.15 gram of adalin may be given five to six times a day. Fluids up to two quarts a a day: Water, lemon juice or tea, two cups of beef broth, 80 to 125 cubic centimeters of whisky may be given. Alcohol is indispensable in coma.

During fast days there is no specific dynamic stimulation of digestion by foods. Metabolism decreases 10 per cent. in the first two days, then to an extent parallel with the loss of weight.

Fast days are employed in cases of threatened or complete eclampsia during pregnancy. The liver and kidneys are here affected, there is an increase of blood sugar without any sugar in the urine. Characteristic of this condition is anuria (lack of urine secretion), edema (swelling of the subcutaneous tissues). The entire protein metabolism is lowered. Salt and the excess of water are both to be avoided for a time.

Thirst and fast days are also very essential in hydropic pregnancy in order to prevent eclampsia.

Fast and thirst days are employed by von Noorden in the treatment of chronic kidney diseases, especially in the pre-eclamptic edema with anuria or oliguria. By restricting water the filtration in the kidneys improves, the diuresis increases, the edema disappears, and with this increased elimination of water the poison is also excreted. By fasting, the liver tends to produce acids, diacetic and oxybutyric, and prevents the transformation of ammonia in the urea. The diet rich in carbohydrates without water would be more effective in the presence of edema, which chiefly affects the kidneys and the brain.

It will be seen, therefore, that in severe diabetes, in chronic kidney diseases, in uremic coma, in eclampsia and the pre-eclamptic stages, in coma apoplecticum (coma after

brain hemorrhage) fast days are advantageous. They must, however, be supervised by the physician who should vary their frequency according to the individual case.

During the War in Central Europe, through lack of food, changes in the bones were observed, resembling senile osteoporosis (rarefying of bone tissue) called hunger osteopathy. The change may be partly due to endocrinopathy, but more probably to the insufficient quantity of food, and especially to the lack of calcium.

2. THIRST DAYS.

Foussagrives was the first to introduce the "thirst day" into scientific therapeutics. Even in the literature of ancient times and the Middle Ages there may be found instances where thirst days are recommended. The Silesian peasant, J. Schroth (1800 to 1850), made a specialty of them and, at the beginning of the second half of the last century many institutions for supervising so-called thirst days (or bread days) were built in Germany. They are of historic importance because they were the forerunners of the sanitariums of present times. The treatment was given originally in cases of syphilis of long standing and in chronic articular rheumatism; later in any chronic and in some acute diseases also.

It is certain that water reduction may have its benefits in some cases, benefits which made Schroth famous, but this treatment has been overdone to a point detrimental to health. For instance, Schroth specialists believed that all harmful substances and bacteria were eliminated more readily from the body by thirst days and consequently employed them in typhoid fever. Cases of scurvy, one of the bad sequelæ of this form of treatment, were seen chiefly in the Schroth institutions.

Schroth gave well-baked rolls *ad libitum;* once a day, a portion of rice and farina puddings, sometimes an egg and

a few glasses of light wine. At night wet packs were used on the patients. At the height of this treatment a few "drink" days were permitted, one bottle of wine, but no water was allowed after luncheon. The treatment lasted from eight to twelve weeks; the daily intake of liquid was about 400 grams, in addition to which there was the liquid content of the food (about 300 to 500 grams). The diet was protein rich, water poor and very rich in carbohydrates. Later through the uniformity of the diet, lack of appetite resulted so that the patient suffered loss of weight due not only to the water restriction, but also to an actual loss of fat.

During these thirst days there was present increased viscosity of the blood and slight fever, and the patients suffered from headaches and malaise, probably due to the retention of uric acid salts in the body. In general, fat persons are able to stand this water reduction better than thin ones. The prolonged thirst, or roll-days, as were formerly given in Schroth institutions are no longer in use. In syphilis this type of treatment is replaced by the excellent modern therapy. Remnants of the principle remain however in the Japanese sand bath and the various forms of Turkish baths. For other purposes such roll-day treatments are given for about two weeks, and prove very efficacious when 600 to 800 grams of bread are given with the addition of rice pudding and 300 to 400 grams of water once a day.

In chronic inflammatory rheumatism and general dropsy, they bring good results, as well as in tubercular dropsy and cirrhosis of the liver. The results in very bad cases of psoriasis are surprising. Lately such treatments (only rolls; no water, but a little warm red wine) have been employed in bacillary dysentery. Even though opinions as to the degree of efficiency of this Schroth roll-day vary, some good results must certainly be admitted; generally two weeks of the treatment is sufficient.

NEWER FORMS OF THIRST DAYS.

In Oertel's book on "The Treatment of Disturbances of the Circulatory System" thirst days are again advocated strongly. He gives the following degrees as most suitable. The first degree consists of a slight reduction of fluids; the intake of liquids and liquid foods, as soups, puddings and ice cream, must not exceed 1¼ liters ordinarily, and in hot weather 1½ liters.

In the second degree this liquid intake of 1½ liters includes thick puddings, soup and raw fruits. These may be endured quite easily for a long time. Even though the restriction of fluids is for some people very difficult to endure, it does not result in any untoward disturbance, such as nervousness, lack of sleep, constipation, functional disturbance of the kidneys, or gout. Once a week a "drink day" may be allowed (2½ to 3 liters of liquid).

In the third degree, the liquid intake should not exceed 700 to 1000 cubic centimeters including the puddings, stewed and raw fruits. An example of such a diet is the first day of the Karell treatment where milk from 600 to 1000 grams are given.

The fourth degree is complete water restriction, which is to be considered only in a very few cases.

Jurgensen gives these restriction days the name hydro-hypodiet, and considers 30 grams as the daily normal need of water for one kilo. of body weight. He makes the following divisions: Slight hydro-hypodiet (with 20 grams of water for each kilo.); strict hydro-hypodiet (15 grams for each kilo.); and very strict hydro-hypodiet (10 grams for each kilo. body weight) equal to 66 per cent. reduction from the normal required amount of water. In all the forms of liquid reduction, salts and thirst-producing substances, such as spices, must be avoided. The protein intake should not exceed 70 to 80 grams a day. In short, a reduction of

the water intake alone is not sufficient and the physician should be consulted regarding the proper diet.

Potatoes and cereals are to be preferred but they should be prepared with only a little salt. Fat may be used also. In most cases, the first degree is sufficient, the second being found necessary only seldom. The third degree is necessary only where retention of water in the body indicates a defective circulatory system and kidneys. Thirst days are usually prescribed in disturbances of the circulatory system and in arteriosclerosis.

Indications for Use:

1. (*A*) *Cases with dropsy* where the reduction in the water intake will aid the effect of cardiac stimulation, as with digitalis. Very often without the aid of the drug the reduction in the water intake alone makes it possible to get rid of the water retention in the tissues, especially in the first stages of decompensation of the circulatory system. The Karell treatment, which reduces the diet to 600 cubic centimeters of milk, is one form of the thirst day. Where milk is distasteful we replace it with salt-poor cereals to which we add sugar, cream and unsalted butter. With this form the daily allotment of 800 to 900 grams contains the same amount of water as does 600 grams of milk. Even better than this is the fruit diet, because of the lack of uric acid salts.

The salt- and water-poor potato diet was used during the war because of the scarcity of milk. Among fruits, the banana and the apple give the best results on account of their relatively small water content. Five to seven days of such water-poor diet should be tried in cases of cardiac dropsy.

(*B*) *Cases with tendency to edema,* where there has been decompensation previously; organic heart trouble with or without arteriosclerosis. These patients are very sensitive

to water, and any excess will bring about water retention in the body. The second degree of the thirst day is found to be suitable and every 8 to 10 days one day of milk (800 grams), or fruit (800 to 1000 grams), may be inserted.

(*C*) *Cases without decompensation.* There are some patients who have diseases of the heart or vessels but without decompensation. Valvular defects of the heart and arteriosclerosis give the greater number of cases in this group. While some authors find the reduction in the liquid intake unnecessary, others think that the drinking of too much liquid always affects the heart. Here there is no need for real thirst days, but an excess of liquid should be avoided. The first degree of water reduction is suitable and once a week a drink day is advisable.

2. *Arteriosclerosis.* Here are found the cases with high blood-pressure and, although the kidneys in such cases are not entirely sound, the ability to secrete water is not impaired so long as the heart is strong. Von Noorden describes how a slight reduction of liquid often has a good effect on hypertonia (high blood-pressure).

3. In *aortic aneurysm* a reduction of the whole diet is of great importance, and especially a restriction of liquids on account of the blood-pressure; here the second degree and very seldom the third degree of water reduction is found to be necessary.

4. (*a*) A slight reduction of liquids is of great benefit in all cases of *chronic nephritis* where the kidneys are still able to bring the urine to normal concentration. If the ability to concentrate is impaired, water restriction is then more necessary.

(*b*) In *chronic nephritis with edema* the results and value of water reduction depend upon the cause of the edema. If the function of the heart is impaired, the results are just as good as in cases of uncomplicated cardiac decompensation. In the real nephritic edema, the water retention is

primarily due to the salt retention, and the first step is to reduce the salt content of the food. In uremia from hardened kidneys there is no need for liquid reduction.

5. In *acute nephritis* thirst days are very important causing elimination of water from the tissues, and increasing the kidney excretion. Complete liquid withdrawal and a resultant complete fast is the mode of treatment in acute nephritis with oliguria or anuria. Fruit juices sweetened and followed by water should be given, but only if the water elimination is not impaired.

6. *Obesity.* These thirst days are a great help in the reducing cure. Von Noorden shows the loss of weight is due to two reasons: *First,* through the reduction in the body liquids due to the elimination of water, loss of fat will occur, if the food contains less than the normal amount of calories. Fat persons eliminate water more easily than thin ones. If the same amount of food and water is given to five fat and to five thin people, the fat individuals average a 30 per cent. greater loss in weight. *Second,* a reduction in the liquid intake diminishes the appetite and need for food. At the beginning of the reducing cure, through thirst days we have a considerable reduction of weight, especially in cases where patients are accustomed to large amounts of fluid. The quick loss of fat and probably the elimination of water from the muscular tissues increases muscular activity, so that patients can do more muscular work. The reduction of liquids protects the heart function, especially in cases of fat people where the heart has been more or less damaged previously. Great reduction of water, as in Degrees 2 or 3, is used at the beginning of the cure (for a week). Later on, Degree 1 is found sufficient; also once or twice a week 600 to 700 grams of water a day are allowed, to avoid storing water in the tissues.

7. *Diseases of the Respiratory System.* A dry diet is very efficacious in the treatment of purulent secretions in bronchiectasis and putrid bronchitis. Three dry days with only cereals, white meat and water-poor fruits show good results. This diet is also very useful in cases with a mucous secretion.

8. *Chlorosis.* After four or five Karell days (one liter of milk a day as the only food, the patient resting in bed), the patients lose two to three kilos of weight and feel much invigorated. The rich feeding then begins although the liquid intake should not exceed one to 1½ liters a day until there is improvement.

9. *Diseases of the Digestive Organs.* In dilatations of the stomach due to muscular weakness or in pyloric stenosis, a reduction of the volume of the liquid intake is very beneficial. In benign stenosis a semisolid diet with zwieback, eggs and easily digested meat, taken for a long period, allows the stomach to regain its motor function.

10. *Cirrhosis of the liver with ascites* (free fluid in the abdomen) is another indication for thirst day. After removing the fluid by tapping, the salt- and water- poor diet is given with surprisingly good results. Three to five days of the third degree of water restriction is used, passing on then if necessary to the second or first degree.

11. *Hemorrhages.* In hemorrhages of the stomach and intestines or lungs, thirst days would tend to increase the concentration of the blood and its ability to coagulate. A very small amount of water (100 to 150 cubic centimeters a day) is given for three to four days. This procedure is very trying but very effective. The same purpose is fulfilled as by the old method of giving very concentrated salt solutions.

3. LIQUID DIET.

The different preparations which are the basis of liquid diet should be described. Milk and milk soups are of

considerable importance. Meat purées, vegetable soups, egg dishes (plain eggnog, wine chaudeau, wine soup) and the fruit soups are also useful. Here, too, belong the great number of cereals boiled in water, the broths, and especially the thick soups. Jelly dishes may also be employed because they liquefy at body temperature, as well as the dishes which become semi-solid when cold, as puddings or custards.

The indications for a liquid diet are as follows: Acute diseases with fever, convalescence from operations on the gastrointestinal tract, and the beginning of treatment of serious gastrointestinal diseases. Suitable liquid dishes must be chosen according to the individual case. We distinguish two main forms of the liquid diet: First, a liquid starvation diet and, second, a liquid diet sufficient to cover the caloric requirement of the patient.

The first is indicated in stenosis of the intestines; in conditions accompanied by short periods of fever, and in the first two days after operations on the gastrointestinal tract; in gastrointestinal hemorrhages (where we disregard the normal food requirement and give only small quantities of milk and tea, broth, or ice-cold milk). The diet serves here more in the nature of a stimulant, incidentally also covering the water requirement of the body. It is administered in small amounts about every two hours.

In the second form of the diet we try, as soon as possible, to supply an adequate quantity of food in fluid form. Surgeons and specialists in internal diseases admit that wounds heal more quickly and the course of the disease is considerably shortened if the patient is not kept too long in a stage of undernourishment. A satisfactory menu follows: In the morning, 250 grams of milk, milk tea or cocoa, zwieback or crackers. At eleven o'clock, 250 grams of milk soup or chaudeau may be given. At noon, chicken purée soup and 250 grams of milk as in the morning. In the

evening, milk soup, fruit soup, or liquid milk puddings may be served. In the intervals, jelly, or other jelly dishes, and ice cream in small amounts may be given. We advocate five meals because experience shows that patients prefer this to the two-hour feeding system and, further, it is a simple system to carry out in hospitals and sanitariums.

Naturally, the preparation of the different liquid diets may be varied according to requirements of the individual case. Alcohol and meat extracts may be allowed in special cases. In diseases accompanied by fever, especially where the kidneys are also affected, it is better to substitute vegetable or other thick soups for meat soups. The degree of intestinal motility must also be considered, thus in acute diseases accompanied by constipation fruit soups tend to have a slightly laxative effect. It is very advisable, especially in the use of the liquid diet to conform to the desires and tastes of the sick patients to the utmost extent possible. Such a diet is suitable in prolonged diseases accompanied by fever, especially in treatment of typhoid fever. Here the purée soups seem to be most suitable, while the different preparations of milk, on account of the tendency to gas formation, must be used with caution.

In the treatment of gastric ulcers, the pure milk diet seems to be of less importance, and even after severe gastric hemorrhages we try to give, as soon as possible, a diet rich in calories. On account of the hypersecretion of the stomach in such cases, we must avoid soups rich in extractive substances; the chicken or veal purée soups, however, will be well digested. The dietetic treatment of gastric ulcers must be suited in later stages to the individual case, but the pure liquid diet alone is necessary in the first eight days.

4. SEMI-SOLID BLAND DIET.

The liquid diet because of its relatively small food value is used only for bed patients. Of far greater importance is the semi-solid bland diet, which covers the caloric requirement of a man getting a small amount of exercise and which on account of its great variety can be employed for a long time. Besides the soups already mentioned in the liquid diet, the semi-solid dishes of greater food value belong here also. Some foods, too, are transformed more easily by digestive processes in this semi-solid stage. Of great value are dishes which are made with egg yolk and beaten white of egg, as puddings and omelettes. The real plain omelettes (without egg whites) do not have the same food value, unless prepared with great care, because of the low fat content. A sample diet follows:

For breakfast: Cocoa, milk or milk tea, crackers, zwieback and butter.

Second breakfast: Milk dishes (one tablespoonful of rice, farina, ¼ liter milk, 20 grams of butter) or porridge.

For luncheon: The patient may have his choice of soups or meat purées, chopped meat, meat puddings, meat soufflés, or roasted white meat finely chopped in butter; unseasoned boiled lean fish; or eggs, as plain omelettes; vegetables, spinach, lettuce, mashed potatoes, mashed carrots, artichokes, desserts, puddings made of flour, rice, farina or tapioca, sponge cake or fruit purées.

Afternoon: Cocoa, milk, milk tea with zwieback or crackers with butter.

In the evening, dishes with one or two egg yolks, or scrambled eggs with finely chopped ham or vegetable omelette, vegetable puddings, ¼ liter of milk or cocoa, or plain omelette with chopped ham, spinach, boiled fish with vegetable purées or ham, rice pudding, Parmesan cheese pudding, cakes, or cream cheese.

In the bland diet we usually give but one dish of meat. Roasted white meat, finely chopped in butter, and lean boiled fish are both easily digested and may be regarded as equal to the finest purées. The desserts can be varied greatly through the addition of sauces made of fruit jams, accompanied by coffee, cocoa or chocolate. The author's personal experience shows that this form of diet is suitable in every disease of the gastrointestinal tract, with the possible exception of carbohydrate dyspepsia and serious stomach disorders, such as fresh gastric ulcers, when a liquid diet is more appropriate. In cases of hyperacidity, because of the small amount of work it gives the poorly functioning stomach, and in cases of hypersecretion, because of low stimulating action on the glandular system of the stomach, this diet is beneficial. This diet treatment will also prove useful in cases of stomach catarrh, because it does not stimulate the secretion of mucus (at the beginning of acute stomach catarrh the liquid diet should be prescribed).

In the after-treatment of gastric ulcers it is a standard diet which should be followed for months instead of the usual four weeks. Where a real ulcer diet treatment is imposed as in very fresh ulcers, or after ulcer hemorrhages, this diet will be found excellent if administered during the second and third week. It is also used for diagnostic purposes as test meals, especially where there is a possibility that hidden hemorrhages may be occurring in the stomach.

In the same way this diet form is used in the treatment of intestinal disorders. It is useful in chronic intestinal catarrh due to lack of mechanical stimulation, preventing thus the process of putrefaction. It serves its best purpose in chronic constipation (vegetable purées are so much better digested in cases of spastic constipation) and usually obviates the administration of laxatives, although small doses of magnesium or rhubarb may be necessary to regu-

late the action of the intestines. This diet form is found to be excellent in cases of mucous colitis, especially in those cases not due to nervous conditions, but to chronic catarrh of the large intestine, with the secretion of large amounts of mucus. The bland diet is also best in the over-feeding treatments, as in convalescents after serious operations and serious diseases. In all these cases there are sensory disturbances in the gastrointestinal tract, as well as loss of appetite due to a reduced gastric function and reduced acid secretion. Here we have to employ more of the soups rich in extractive substances, fatty puddings and sauces.

In overfeeding treatments five meals seem to be sufficient and are an improvement over the previous two-hour meals. For the first breakfast and the afternoon meal larger amounts of butter, and at night or afternoon a glass of milk may be added. This diet form is usually poor in extractive substances and makes use of very little salt; consequently, it is suitable in the treatment of gout and kidney diseases. Through the right choice in menus (for luncheon plain omelet, instead of meat, and thick soup instead of broth), its content of extractive matters may be even more reduced. This form would be advisable in those skin conditions where a relation to the gastrointestinal tract probably exists (urticaria and furunculosis).

In the dietetic treatment of liver diseases there are two things to be considered: The usual involvement of the intestinal tract, and the lessened ability of the liver to counteract poisonous substances. The semi-solid bland diet is useful here, but only if the amount of fat is reduced.

5. COARSE DIET.

(Constipation Diet).

The coarse diet is composed of all foods which are not finely cut up. Its chief indication is constipation. Some other authors prescribe it in cases of colitis. Fruits, raw or

stewed, whole wheat bread, dry fruits, cooked and raw vegetables, not mashed, are the main articles of food in this diet, with protein in addition in any form and butter. An example of such a diet is:

Breakfast. Tea or coffee, whole wheat bread, butter, stewed apples, or raw fruit in season.

Luncheon. No soup; any kind of meat, boiled, broiled or roasted; vegetables, such as string beans, cauliflower, spinach, lettuce, any kind of legumes; salad; light desserts, stewed or raw fruits; whole wheat bread, butter and cheese.

Dinner. Same as luncheon.

The amount of whole wheat bread per day is 250 grams, of butter 200 grams, of fruit 500 grams. Of the dry fruits, figs and dates are the best. This diet form may also be used in cases where suralimentation is necessary. As mentioned above, this diet is very efficient in cases of constipation where there is a normal function of the stomach, and in cases of colitis, where a smooth diet was formerly prescribed.

6. STARCH-FREE DIET.

(Protein-fat Diet).

Another diet of great importance is the starch-free diet. This is most efficacious in the treatment of diabetes (see p. 150), where sugar and starch-containing foods are eliminated or given only in small quantities. With this diet a larger amount of fat is necessary. Meat, prescribed vegetables and fruits are allowed. All sugar, all dishes prepared with wheat flour, rice, farina, potatoes, and legumes are prohibited.

Allowed Vegetables: Spinach, lettuce, cabbage, cauliflower, string beans, all kinds of green salads, cucumbers, artichokes, fresh asparagus, tomatoes, radishes; all prepared

without flour and cooked in best-grade butter. (See von Noorden's Table, Diet in Diabetes.)

Example:

First breakfast.	Coffee with butter and cream.
Second breakfast.	Scrambled eggs with butter, bacon or fat ham or sardines.
Luncheon.	Bouillon, egg, bone marrow and vegetables. Meat, limited quantity with vegetables, Swiss cheese with butter or diabetic dessert, fruit (apples, oranges, pears, peaches, strawberries, gooseberries, bilberries), and sour white wine.
Afternoon.	Coffee with butter and cream.
Dinner.	Meat and vegetables; or fish or egg omelet with vegetables, white wine.

The quantity of butter or bread has to be prescribed for the day according to the individual case. One egg of 50 grams weight is equal to 70 grams of meat or 50 grams of fish.

The foods must be weighed; it is not wise to cut out starch-containing foods too suddenly, nor to reduce too quickly the amount of protein. It is always advisable in prescribing the diet to use at first the same amount of protein the patient was accustomed to before starting his diabetic treatment. The carbohydrates with the exception of such as are taken as milk and fruits are given in the form of bread; 80 to 100 grams of bread daily will make the diet palatable. We start with rolls or rye bread which gradually are replaced with other kinds of bread, poor in carbohydrates (gluten, aleuronat, tropon or liton bread). Only after the weight has reached an equilibrium and sugar elimination has become constant can we reduce the proteins, especially meat. The amount of fat, which in the beginning is 60 to 80 grams a day, used

on bread and in coffee, will gradually be increased in amount with the reduction in protein, or if the weight of the patient requires it. Ordinarily we do not need to go over 100 to 120 grams of fat per day. In most diabetic cases the sugar elimination diminishes when the protein is given in the form of fish or egg instead of meat, especially in diabetic cases with a gouty basis and with kidney complications. In all these cases boiled meat and white meat such as chicken will be preferred, avoiding spices and replacing broths with vegetable soups. This diet is the transition to the vegetable, egg and fish days which are so frequently used in diabetes. An example of such a diet is:

First breakfast.	Tea with two tablespoonfuls of cream.
Second breakfast.	Spinach with one to two fried eggs.
Luncheon.	Tomato soup, 150 grams fish (weighed after cooking), with vegetables.
Dessert.	(See recipes for special diabetics.) No fruits.
Afternoon.	Tea with two tablespoonfuls of cream.
Dinner.	Egg dish with vegetables. For the entire day, air bread (French air bread, Heuderbert); butter, as much as can be taken on the air bread.

After one or two such vegetable-egg-fish days the urine is usually free from sugar and we can go back to the standard diet, employing different sorts of bread according to the amount of carbohydrates contained. In successful cases, the tolerance for carbohydrates increases. If 100 grams of ordinary bread does not, over a considerable period of time, increase the sugar elimination, then we can replace a part of this carbohydrate by other carbohydrate-containing foods.

Von Noorden's Table shows the equivalent of different carbohydrate-containing foods to a stated amount of ordinary wheat bread. (See Table, Diet in Diabetes.)

With the exception of very light cases of diabetes it seems very advisable, even if the urine is free from sugar, not to exceed the amount of 100 grams of bread for a long time. Only in young diabetics does milk, as an addition to the diet, seem to be of very great benefit. In severe cases, where sugar elimination is not checked by vegetable-egg-fish days, we employ fast days more successfully as described later. The patient is made to fast while at rest in bed, and only tea, black coffee, broth, and white wines are allowed. A modification of these fast days is von Noorden's vegetable days during which the patient is allowed green vegetables in addition to the liquids. These purely vegetable days are, in fact, fast days, and there is always a loss of weight associated with them. By the addition of four to six eggs, vegetable days are made more tolerable without exerting too bad an influence on the sugar elimination. Vegetable days are given before and after oatmeal days. We have already described the arrangement in speaking of oatmeal days. (See p. 153.)

One of the unpleasant complications in the treatment of diabetes is the disturbance of the digestive system; acute diseases with fever, and especially surgical complications of the gastrointestinal organs, may affect the alimentary tract. A starch-free diet is certainly not suitable for these cases. It is necessary sometimes to drop the restricted and systematic diabetic diet because of digestive disturbances. According to the degree of gastric or intestinal upset we pass to the liquid or to the semi-solid smooth diet. A liquid diet suitable for the diabetic is as follows:

First breakfast.	Tea with milk.
Second breakfast.	Oatmeal soup.
Luncheon.	Meat purée soup.
Afternoon.	Tea and milk.
Dinner.	Oatmeal or meat purée soup. Even where there is danger of coma such a diet can be successfully used.

Following this diet a half-solid diet of low starch content can be given, as for instance:

First breakfast.	Tea and cream.
Second breakfast.	Plain omelet.
Luncheon.	Vegetables, purée soup, meat hash with spinach or lettuce. Diabetic dessert (soufflés, apple sauce).
Afternoon.	Tea and cream.
Dinner.	Fish with vegetables or scrambled eggs and vegetables. Spanish pudding or Spanish omelet. Where there is need of a large amount of carbohydrates, soup at noon and at evening can be replaced by oatmeal soups.

A starch-free diet may well be used with certain modifications in reducing cures, which to be effective, must take into consideration the qualitative composition of the food in addition to consideration of the quantitative reduction. It is certain that reduction of the carbohydrates is the most effective, but, in addition fats, on the whole, should not be given so freely as to diabetics. Vegetables prepared in the English style with very little butter may be given in large amounts. The allotted quantity of fat must not exceed 30 to 40 grams a day. Patients are often surprised at their success in reducing, although they are getting a varied and voluminous diet. By prescribing vegetable, egg, fish or pure meat days, the loss of weight will be greater. We should at the start be satisfied with small losses of weight, and proper exercise should be encouraged.

In the treatment of disturbances of the circulatory system, the starch-free diet is very successful. Lack of carbohydrates prevents the formation of gas and the diuretic effect of the vegetables improves the circulation. This diet is also very successful in treating abnormal fermentations in the intestines.

7. THE LOW-SALT DIET.

The low-salt diet is the earliest form of special diets to come into common use. Unconsciously we used, a long time ago, the Karell milk days, fruit days, and some forms of vegetarian days, which are nothing but a modification of the low-salt diet. Only since the importance of the chlorides in nephritis has become known have we arrived at a clear understanding of the therapeutic efficacy of this diet.

It is difficult to define a low-salt diet precisely, as we do not know the minimum requirement of the body for salt. The most commonly used diet contains very little salt; for instance, milk, rice and fruits, totaling about 4 to 5 grams as the daily average of salt. Any salt ingested over this amount, which is not absolutely necessary for the general body metabolism, serves more as a stimulant. We divide the low-salt diet into four degrees, as follows:

First Degree.—The mild form of low-salt diet (daily average 5 to 10 grams). This means giving up all the unnecessary salt and making the diet contain just sufficient salt to improve the taste of the food. No diet containing over 10 grams of salt can be called a low-salt diet.

Second Degree.—Moderately severe form of low-salt diet (daily average 3 to 5 grams), which covers the minimum requirement for salt in the mixed diet.

Third Degree.—A severe form of low-salt diet (daily average, 1½ to 3 grams). This form can be used for only two to three weeks.

Fourth Degree, or most restricted form of low-salt diet. The average quantity here is less than ½ a gram. This form is employed on special days only, for not more than a few days.

The low-salt diet is not entirely without harm although the cases of achlorism (a condition due to lack of salt in

food) are rare. The main symptom is a complete lack of appetite, not only for foods which are customarily prepared with salt, but for all solid and liquid foods with the exception of fruits. Very often general metabolic disturbances and weakness appear which may prove as detrimental as the original illness for which the diet had been prescribed. The acid secretion of the stomach is chiefly impaired by a continued use of this diet, and this provokes lack of appetite. This diet must be prescribed just as carefully as any medicine by a conscientious, observing physician.

THE AIM OF THE LOW-SALT DIET.

The low-salt diet serves three purposes:

1. To *preserve the kidneys.* In certain kidney diseases salt is very badly excreted. All the excreted substances are irritating to the diseased kidneys. To prevent the storage of the substances in the body and to prevent the stimulation of the kidneys through their secretion, we restrict salt in the food.

2. To *deprive the tissues of water.* If, because of a faulty functioning of the kidneys, salt is stored in the body, water also will be stored and will impregnate the tissues. It is very important to eliminate the unnecessary salt. This is accomplished by reducing the quantity of salt introduced with food below the level of the amount the kidneys are able to excrete. The kidneys then will be able to eliminate a part of the superfluous salt from the blood and with it the water. The salt will pass from the tissues into the blood and the kidneys will take care of it. As soon as the kidneys are not burdened with too large an amount of chlorides they will, in a short time, partly regain their ability to function and will eliminate from day to day increasing amounts of salt and water, much greater than before the institution of the diet.

3. *Thirst day treatments.* If we desire for any purpose to reduce the intake of liquid (as in thirst days) we must concomitantly lower the salt intake, otherwise successful thirst days are impossible.

4. To **increase the efficacy of bromides,** as in epilepsy. Bromides are very efficient if a low-salt diet is given at the same time.

INDICATIONS FOR A LOW-SALT DIET.

1. The *hypochloruric kidney diseases* with edema or tendency to edema. The beneficial effect of milk days in patients with renal edema is due to the salt poverty of this diet. In such milk days 2½ to 3 quarts are used daily, the salt quantity totaling 4½ grams which corresponds to the second degree of low-salt diet (1.5 grams of salt per one quart of milk). In all hypochloruric kidney diseases with edema we should start with a small salt quantity; the third or fourth degree would be advisable, reducing the milk to one quart a day or choosing other low-salt diet forms which furnish a higher caloric value. With an improved renal filtration for salt and a consequent disappearance of the edema we still adhere to the low-salt diet, employing, however, the second degree and very slowly passing to the first degree. The intervention of a salt-free day every week is found useful. Even though we do not entirely clear up the symptoms with the low-salt diet, we certainly help the condition, avoiding the continuous irritation of the kidneys by the salt. This diet is most efficacious in cases of dropsy. In severe cases of dropsy, for months and months patients are in such bad condition that the body weight increases 40 to 60 per cent. due to water accumulation. Through the use of a real low-salt diet the dropsy gradually disappears.

2. *Kidney diseases without edema.* In this group may be placed cases of hypochloruria (diminished salt excre-

tion) where edema is ready to appear, but does not become visible because the salt does not exceed the salt threshold. In some forms where the salt is badly eliminated, especially in the arteriosclerotic, hardened kidney and in some nephroses we must stringently avoid salt, choosing the first degree of the salt restriction and, once a week, a salt-free diet. It is very advisable to determine the capacity of excretion for salt in the kidneys and to give afterwards a third of the tolerance found. In cases of hardened kidneys the blood-pressure decreases noticeably under the low-salt diet.

3. *Cardiac dropsy* is also a field for the low-salt diet.

4. Thirst day treatments of all kinds (*obesity, disturbances of the circulatory system* and in *diabetes insipidus*). These days succeed only on a low-salt diet, since thirst would be unbearable without it.

5. *Epilepsy.* Here the storage of bromides in the organism is more rapid and more complete if we restrict or cut out the salt entirely from the food. In this way we can also reduce gradually the amount of bromides, a very important factor in severe cases of epilepsy.

6. *Skin diseases.* Chloracne is a skin disease usually occurring in factory workmen where they come in contact with chlorine. By giving them the low-salt diet they lose the skin infection which is produced through salt action on the skin. A low-salt diet is advisable also in ordinary acne, eczema, prurigo, urticaria, pemphigus, as well as in pruritus senilis.

7. *Hyperacidity of the stomach.* In reducing the salt to the first degree of restriction many of the hyperacid disturbances seem to disappear, although the hydrochloric acid content of the stomach has not been found to be reduced in these cases, even though they were put on the second degree of salt restriction. This beneficial effect is probably due to the fact that the low-salt diet does not

stimulate a very sensitive stomach. In hyperacidity or in ulcers, by the use of the third degree of restriction, measurable acid quantities have been found to be reduced.

8. In *intestinal irritative conditions,* especially diarrhea, a low-salt diet has been employed for a long time. The second degree of restricted salt diet is generally used. A greater restriction does not seem necessary.

9. *Diseases of the lower genito-urinary apparatus.* Where there is a tendency to form stones, especially uric acid stones, concentration of the urine has to be kept as low as possible and, consequently, the low-salt diet is a great advantage. In inflammations, especially of the bladder and urethra and where there is a tendency to hemorrhages as in tumors of the bladder, urine rich in salt always irritates and causes pain. Here the first degree of low-salt diet is sufficient, but where there is present a very great sensitiveness of the bladder or paralysis of the bladder muscles, the second or third degree of low-salt diet will be necessary.

10. The ordinary diseases where the low-salt diet is indicated are *inflammatory dropsy,* such as *tubercular pleurisy* and *peritonitis, ascites* due to cirrhosis of the liver, *hypochloruric* and *arteriosclerotic kidneys,* also in nervous diseases such as *neurasthenia, hysteria* and other nervous troubles, in *gout* and *rheumatic diseases* and also in vigorous old people where the salty foods produce a feeling of pressure in the stomach and gas formation.

THE DETERMINATION OF SALT TOLERANCE.

Before prescribing salt restriction for a long time, we should know the amount of salt taken up to that time. Only afterwards can we decide whether a restriction is necessary. In normal conditions of excretion, as is the case with a healthy heart and kidneys, we learn about the salt amount through the determination of chlorides in the urine of a twenty-four hour specimen, as generally the excretion

is equivalent to the amount taken with the food. It is usually advisable to take the average of three days. In cardiac patients with reduced excretion of urine, in all kidney diseases and every form of dropsy, this method is inadequate because a large amount of salt has found its way into the tissues. To determine accurately the tolerance of the patient we give a diet containing an amount of salt equal to that excreted in the previous day's examination. Then we control the salt balance for three days by the standard diet and add on one day of this test diet a further amount of salt—for instance, 10 grams. Under normal conditions of excretion this amount should in 24 to 48 hours appear as an additional quantity in the urine. The deficit thus will give a measure of the insufficiency. For instance, a patient with hardened kidneys and slight edema excreted under this diet, on three consecutive days, 4.5, 5.2, and 4.7 grams—an average of 4.8 grams. Then he was given a test diet of two quarts of milk (equal to 3 grams of salt), 100 grams of rice (equal to 1.04 grams of salt), three oranges (equal to 0.01) with 1.8 grams of salt added to the rice, totaling 5.85 grams of salt. The results were, first day of the test diet alone 6.1 grams; second day, 4.6 grams; third day, 5.3 grams; fourth day with the addition of 10 grams of salt, 8.9, and fifth day of test diet alone, 6.8. From the addition of the fourth day only 3.5 grams were excreted in the next 24 hours, and the next two days brought only a very small amount in addition to the one excreted in the first three days. This indicates a high grade inefficiency in salt elimination. The patient had to go back to 2½ to 3 grams of salt a day. After three weeks the tolerance of salt went up and the addition of 10 grams resulted in a total elimination of 7.1 grams the first day and 1.8 grams the second day. We can add more salt, and the patient can stand without harm 6 to 7 grams of salt a day.

TECHNIC OF THE LOW-SALT DIET.

Some very important and well-known diet forms, which are much employed, have the advantage of being salt-poor and at the same time easy of execution, as, for instance, pure milk diet, the milk-cereal-fruit-sugar diet which can be given for a very long time and the pure fruit diet, which, on the other hand, cannot be prescribed for more than a very short period of time. In the strictest forms the choice among the allowed beverages and food is not very large. They are not only reduced on account of the salt content but also on account of the content of other substances, such as proteins. No great difficulties are connected with carrying out the first degree of the low-salt diet. Much harder are the second and third degrees where the patient has to be kept for a longer time on the diet in order to obtain the effects, and where at the same time it is necessary to vary the food constantly so as not to cause loss of appetite.

First Degree of Low-salt Diet.—Here the endeavor is to prepare all solid and liquid dishes with less salt, avoiding the use of any salt during the meal. It is well also to avoid all the foods which carry salt, such as smoked meats, fish, preserved vegetables, salted string beans, cucumbers, cabbage, also preserved meats, extracts, and bouillon cubes. Where advisable, from time to time, a chloride determination in the urine has to be made to control the amount of salt excreted with the intervention every fifth or tenth day of a salt-free day. The first degree of the low-salt diet can be kept up a very long time, this being advisable as a prophylaxis in cases where we fear chloride storage, where we want to safeguard endangered kidneys, and where the appearance of severe chloride retention is overcome and we wish to prevent a new retention; as well as in epileptics.

Moderately Severe and Strict Forms of Low-salt Diet.—These forms are considered together, being similar in their technic and therapeutic value. They differ from the first degree diet prescribed, in that they can be prescribed for a few weeks only instead of for a very long period of time, mainly because we add less salt to the one diet than to the other. From a practical standpoint, they are both very important.

The most restricted form (fourth degree) is the best to prescribe for dropsy, but for increasing the secretory ability of the kidneys for chlorides, where, even after the disappearance of edema, for weeks and months the most intensive care is necessary, the third and second degree of low-salt diet with ½ to 3 or 3 to 5 grams of salt will be found most advisable.

(*a*) *Salt-poor Foods.*—In a very simple way it is possible to arrange a varied diet which does not contain more than 2½ to 3 grams of salt. By carefully choosing the foodstuffs this may be reduced to ½ to 2 grams. It is essential to start with raw materials and prepare them salt-free. All the raw materials, animal and vegetable, are very salt-poor. For instance, only when a large amount of milk is added to the diet, for example, 1000 to 1500 grams with 1.6 to 2.4 of salt do we exceed the limit. In this diet belong many salt-poor prepared foods such as unsalted butter, unsalted fat of pork, geese and vegetable fats and palmin.

Milk and milk equivalents (cream, skimmed milk, buttermilk, sour cream and kephyr). A very salt-poor substitute for milk is the vegetable milk made of almonds, Brazilian nuts and cocoanuts and also the Soyama milk. Oysters should be excluded because of their salt content of 0.16 per cent. even after the salt water has been washed out. Sea fish contains about 0.3 to 0.4 salt. It loses this during boiling in unsalted water, but it is best to use river fish in its place.

Meats.—They are generally salt-poor and can be prepared without salt.

Cereals are all very salt-poor, none of them reaching 1 per cent.

Bread.—The bread commonly used is not available for our purpose. Its salt content varies between 0.2 and 1 per cent. In the large cities bread may be obtained without any salt used in its preparation, for the most part wheat bread. The salt content does not exceed 0.01 per cent. Patients very easily become accustomed to an unsalted bread which tastes much better when it is toasted.

Vegetables are generally very poor in salt (0.44 per cent. to 0.75 per cent.), and are very useful in this diet. Young peas, carrots and asparagus are especially useful.

Cheese.—Most of this contains between 1 and 6 per cent. salt; Parmesan cheese which contains 1.2 per cent., used in seasoning soups or sauces or desserts, vegetable or egg dishes, on account of the small amount needed is very helpful in the low-salt diet.

Mineral Waters.—Most of them contain a large amount of salt, but some are salt-poor.

A table which shows the salt content of the foods used in the low-salt diet follows. The salt amount given is for 100 grams of substance:

Poultry, game	0.130	Leaf and stalk vegetables	0.120
Calf's brains	0.290	Spinach	0.225
Sweetbreads	0.200	Endive	0.280
Sea fish	0.260	Asparagus	0.050
One egg	0.098	Rhubarb	0.053
Milk	0.160	Tomatoes	0.010
Cream	0.130	Artichokes	0.036
Potatoes	0.050	Cucumber	0.060
Root vegetables	0.060	Pumpkin	0.030
Celery	0.250	Legumes, fresh	0.068
Cabbage	0.040 to 0.120	Legumes, dry	0.083

Mushrooms, fresh	0.022
Fresh apples, apricots, peaches, plums, prunes, oranges, less than	0.010
Pears, sour cherries, grapes, figs,	between 0.010 and 0.030
Pineapple	0.048
Cherries	0.082
Bananas	0.130
Dried fruit	0.120
Nuts	0.110
Almonds	0.040
Rice	0.009
Corn	0.019
Oatmeal	0.026
Barley	0.033
Macaroni	0.070
Cocoa	0.006
Chocolate	0.070
Desserts	0.050
Sugar	0.010
Fats, butter unsalted	0.070
Swiss cheese	0.200
Pot cheese	0.240
Parmesan	1.700

The Seasoning of Foods.—The low-salt diet must be carefully prepared and seasoned in order to improve its taste. If the kidneys are not diseased the choice is quite easy. Roast foods are mostly used. Roast products are harmless and make good spices. For instance, potatoes, carrots, onions, celery, after eliminating the water in which they are boiled, are roasted in unsalted fat under dry heat and then powdered finely. This powder serves as a very good seasoning for soups and sauces. Some cheeses are useful for seasoning, such as Parmesan cheese. Tomatoes, especially with soups and sauces. Among acids, vinegar and lemon juice are allowed. Other spices are lemon skin, estragon, Kümmel, marjoram, parsley, celery leaves, timion, mustard, vanilla and cinnamon.

Meat broth may be used in the low-salt diet and for seasoning vegetables and other dishes. Desserts do not need any additional salt. Bromides are used to replace salt, but as they are not very beneficial in nephritis their field of use is quite small, except in the treatment of epileptics.

Examples of diet forms, which belong to second and third degree of low-salt diet and which may be used for several weeks without any difficulty, follow:

1. **Pure Milk Diet** (von Noorden).—At least 3 quarts of milk or 2 quarts of milk and 300 grams of cream used with tea, coffee or cocoa with sugar is needed for the greater number of kidney patients. This diet is too rich in proteins. Instead of fresh milk we may use sour milk, yoghurt or kephyr.

(*a*) Three quarts of milk daily, equal to 105 grams protein, 4.5 of salt, 1950 calories.

(*b*) Three quarts of milk daily, 1 pint used as milk tea and milk cocoa, equal to 111 grams of protein, 4.6 of salt, 2505 calories.

(*c*) Two quarts of milk and 300 grams of cream daily equal to 114 grams of protein, 5 grams of salt, 2070 calories.

2. **Milk Rice, Sugar Fruit Diet.**—Fifteen hundred grams of milk, 300 grams of cream, 100 grams of rice, 100 grams of sugar, 500 grams of apples daily equal to 75 grams of protein, 2.8 of salt, 2775 calories.

3. **Milk, Eggs, Rice, Sugar, Fruit Diet.**—Four egg yolks added to the above, the whole diet equal to 86 grams of proteins, 2.9 of salt, 3010 calories.

4. **Milk, Eggs, Meat, Potatoes, Butter, Fruit, Sugar Diet.**—Daily 1500 grams of milk, 2 whole eggs, 2 egg yolks, 250 grams of meat, 500 grams of potatoes, 500 grams of apples, 100 grams of sugar equal to 92.8 grams of protein, 3.2 of salt, 2400 calories.

5. **Milk, Meat, Tea, Eggs, Potatoes, Vegetables, Bread, Butter, Rice, Fruit, Sugar Diet.**—One hundred grams of meat, 250 grams of meat broth, 2 whole eggs, 2 egg yolks, 250 grams of potatoes, 1000 grams of milk, 250 grams of vegetables, 250 grams of salt free baked bread, 150 grams of unsalted butter, 500 grams of apples, 100 grams of sugar to rice and fruit, and milk tea daily equal to 102 grams of protein, 2.3 of salt, 3160 calories.

The strictest form of the low-salt diet is prescribed in acute and chronic nephritis, and also for eliminating the water in decompensated heart diseases; it is sometimes necessary to reduce the quantity of salt to the smallest possible amount. Such diet forms are feasible only for a few days, being not only salt-poor but very poor in protein and calories and are given to patients suffering from diabetes, gout and obesity.

A few examples of the most restricted form of the low-salt diet follows:

Milk is not used for this purpose unless we want a very small bulk of food as in the beginning of the typical Karell day treatment (600 grams of milk with 0.96 of salt).

1. Days of Vegetable Milk.

(*a*) Two thousand grams of almond milk daily equal to 66 grams of protein, 0.134 of salt, 1860 calories.

(*b*) Two thousand grams of Brazilian nut milk equal to 58 grams of protein, 0.168 of salt, equal to 2300 calories.

(*c*) Two thousand grams of Soyama milk daily equal to 75.4 of protein, 0.02 of salt, 1280 calories.

2. Fruit Diet.

(*a*) Daily 1400 grams of apples, equal to 6 grams of nitrogen substance, 0.08 of salt, 745 calories.

(*b*) Daily 1600 grams of strawberries, 1400 grams of bananas, equal to 19 grams of nitrogen substances, 1.8 of salt, 1225 calories.

(*c*) Daily 200 grams of walnuts, 1000 grams of oranges equal to 44 grams of nitrogen substance, 0.24 of salt, 1840 calories.

3. Fruit, Egg Diet.

(*a*) With addition of two eggs equals 18 grams of nitrogen substance, 0.28 of salt, 890 calories.

(*b*) Addition of two eggs and 100 grams of sugar equal to 91 grams of protein, 0.45 of salt, 1100 calories.

4. **Fruit, Rice, Sugar, Egg Diet.**

(*a*) Daily 1400 grams of apples, 100 grams of rice, 100 grams of sugar, equal to 14 grams of nitrogen substance, 0.18 of salt, 1590 calories.

(*b*) Addition of two eggs equal to 26 grams of nitrogen substance, 0.38 of salt, 1635 calories.

5. **Fruit, Bread, Butter, Sugar, Egg Diet.**

(*a*) Daily 1000 grams of apples, 300 grams of bread, 100 grams of butter, 100 grams of sugar.

(*b*) Same with addition of two eggs.

6. **Vegetable, Milk, Potatoes, Bread, Butter, Fruit, Sugar, Cocoa Diet.**

(*a*) Daily 1 quart of Soyama milk, 300 grams of potatoes, 300 grams of wheat bread, 150 grams of unsalted butter, 500 grams of apples, 50 grams of sugar equal to 61 grams of nitrogen substance, 0.57 of salt, 3360 calories.

(*b*) The same with addition of 2 eggs equal to 73 grams of protein, 0.77 of salt, 3500 calories.

7. **Vegetable, Milk, Bread, Rice, Fruit, Butter, Sugar Diet.**

8. **Potatoes, Fruit, Butter Diet.**

Daily 1000 grams of potatoes, 150 grams of unsalted butter, 500 grams of apples equal to 20 grams of nitrogen substance, 0.65 of salt, 2250 calories.

8. THE LOW-PROTEIN DIET.

Assuming that the diet of a normal caloric value contains about 80 grams of nitrogenous substances, we ordinarily distinguish three degrees of protein reduction: First, a slight reduction (60 to 80 grams of protein); second, a more stringent reduction (40 to 60 grams of protein); and third, approaching complete reduction of nitrogen (less than 40 grams of protein per day).

FIRST DEGREE.

Slight Reduction in Protein.

This degree of moderate protein reduction is the only one which can be practiced for any length of time. It should not be employed as a standard diet for the healthy. The arrangement of this diet is very simple. We exclude meat in any form and restrict protein such as milk, cheese and eggs, to bring our nitrogen requirement down to the desired level. It corresponds to a mild form of vegetarian diet. In fact, the strict form of the vegetarian diet can be employed as a low protein diet, if protein rich vegetables, especially the legumes, constitute the main bulk of the diet. The following approximate equivalents are of importance.

About 20 grams of protein are contained in:

100 grams lean meat.
110 grams fat meat.
70 to 75 grams boiled beef.
80 grams boiled veal or pork.
75 to 80 grams boiled meat.
85 to 90 grams ham.
110 grams fish.
100 grams boiled fish.
3 to 3½ eggs.
600 grams milk.
60 grams lean cheese.
70 to 75 grams fat cheese.

A meat-free diet containing about 75 grams protein would be composed of:

500 grams milk.
One egg.
300 grams wheat bread.
300 grams potatoes.
150 grams vegetables.

40 grams rice.
100 grams butter.
100 grams sugar.
Total calories about 3200.

In addition we employ the protein-free beverages such as coffee, tea, fruit juices, unfermented wines and real wines. In this simple way we satisfy the caloric requirement, but it is, nevertheless, necessary to be very careful in the choice of the main proteins, such as milk and eggs, to avoid exceeding the prescribed amount of protein. The milk diet supplies sufficient calories and corresponds to this first degree of protein restriction if a part of the milk is replaced by cream, otherwise the protein requirement is exceeded. Other useful diet forms can be chosen from the modified milk diet where the amount of milk is reduced to one-half quart, with cereals, dried fruits and other nitrogen-poor materials making up the balance. A simple diet containing meat follows:

Breakfast.	Coffee with cream, 50 grams; rye bread, 125 grams; butter, 30 grams; sugar, 20 grams.
Second breakfast.	Soup made of oatmeal, 30 grams; butter, 30 grams.
Luncheon.	Meat broth with rice, 20 grams; boiled beef, 80 grams; spinach, 100 grams; potatoes, 200 grams; butter, 20 grams; potatoes and vegetables, 50 grams; dried plums, 100 grams, with 30 grams of sugar.
Afternoon.	Coffee with cream, 30 grams; rye bread, 75 grams; honey, 25 grams; sugar, 30 grams.
Evening.	Macaroni, 60 grams; with cream, 40 grams; butter, 20 grams; figs or dried fruits, 50 grams; apples, 200 grams.

This diet contains 66.6 grams of protein, yielding a total of 3430 calories.

Indications for the use of this reduced protein diet are many. Most important are kidney diseases in mild form, especially for a few weeks after the disappearance of acute symptoms; in the arteriosclerotic kidney with relatively good excretory power; in gout and in kidney stones, where not only reduction of meat but avoidance of a high protein amount is necessary. It is useful also in diseases with fever and in exophthalmic goiter, diseases with increased metabolism where a rich protein diet would increase oxidation. It may be further employed in intestinal diseases with increased protein putrefaction (large excretion of indican in the urine). In chronic skin diseases such as eczema, prurigo, urticaria you see good results from protein restriction, although a slight reduction is not always sufficient, and the second degree of restriction may have to be resorted to for from two to four weeks. In all the severe and moderately severe forms of diabetes we dislike to increase protein in the daily diet over 80 grams, because these are apt to be cases sensitive to protein, and it is possible to feed more carbohydrates if the protein limit is not exceeded. We can vary the diet in these cases by alternating high protein days without carbohydrates with protein-poor days plus carbohydrates. The fats must naturally play a greater rôle in both forms of diet. In all kinds of nervous disorders patients should have reduced protein diet, the first degree of restriction being the most appropriate. The degree of restriction, however, should be governed by experience in each individual case. The main contraindication for protein restriction is tuberculosis (lungs, bones, glands and skin), provided there are no other concomitant diseases such as nephritis, or danger of nephritis, to force us to its use. Experiments have shown that a rich protein diet has an especial protecting power

against the growth of the tubercle bacilli and the resultant toxemia.

SECOND DEGREE.

Severe Protein Restriction.

This degree is to be used over very short periods of time only (from about three to six weeks) and must take into account loss of body protein. Only a large amount of carbohydrate added to this diet will prevent loss of body protein and it is not always feasible to do this. The details of this diet are simple. We put our patients on a diet containing only vegetables in which the fresh legumes are also given (dry legumes only exceptionally and in small amounts). The limit of 50 grams of protein must not be exceeded. To this diet can be added a few animal foods such as meat broth, bone marrow and bacon. We can allow very little milk, because of its high protein content, but cream, sweet or sour, can be used to prepare flour and potato dishes and as an addition to vegetables, or to tea, coffee or chocolate. Egg yolk may also be employed, but the whole egg only if the protein content of the total diet allows it. The bulk of the diet is made up of cereals, bread, potatoes, fresh vegetables, fruit, sugar, honey, fruit juices, with the addition of fats such as butter, bacon, bone marrow, vegetable fats and oils.

(von Noorden.)

	Grams.		Grams.
Coffee, tea, meat broth	200	Carrots	100
Rye bread	300	Dried apples	100
Potatoes	300	Strawberries	250
Macaroni	60	Cream with 25 per cent. fat	100
Two egg yolks		Butter	200
Young peas	100	Sugar	100

We have here a diet containing about 55 grams of nitrogenous substances. If less protein is desired we reduce the bread intake and give more potato. Instead of fresh peas

which are rich in nitrogen, other vegetables are employed such as cauliflower, asparagus, celery, and red cabbage. Should the caloric content be too high, butter could be reduced.

Protein content of the whole diet is 53.7 grams, calories 4031. The field for prescribing this severely restricted protein diet is not as large as with the former one. Indications for use:

(a) *Kidney Diseases.*—In the first place, subacute and chronic forms of parenchymatous nephritis and, secondarily, inflammatory hardened kidney. Here the protein-poor period (40 to 60 grams of protein) can be prolonged up to eight weeks, provided the patients are not too weakened by it.

(b) *Intestinal Diseases.*—In some of the intestinal diseases, especially in severe intestinal catarrhs, the restriction of protein for a few weeks is of great benefit. Meat and eggs are to be avoided, while milk is quite advisable. In some cases, when the hydrochloric acid of the stomach is lacking (achylia gastrica) with secondary intestinal disturbances, the restriction of protein, especially eggs and milk, is of great advantage.

(c) *Diabetes.*—Short periods of protein-poor days are very efficacious in the treatment of diabetes. The vegetable days (as prescribed by von Noorden), oatmeal and other starch days can be employed, corresponding to the second degree of protein restriction. Frequently, it is of advantage to add to the vegetable days, protein-poor carbohydrates, for instance, potatoes or fruits, one day employing the usual restricted diet, the next vegetables, eggs and carbohydrates.

A sample diet of an oatmeal day with eggs is: 250 grams of oatmeal, 300 grams of butter, four eggs containing 49.7 protein, 285 grams of fat, 166 grams of carbohydrate, 0.70

salt with a caloric equivalent of 3535 calories. Without eggs, only 26.1 grams of protein, 3233 calories.

Example of vegetable day with egg yolks:

Tea, coffee, meat broth 400 grams (without salt); air bread, 20 grams; 2 egg yolks, leaf vegetables, 200 grams; cucumbers, 100 grams; asparagus, 300 grams; bacon, 50 grams; butter, 150 grams (not salted); olive oil, 10 grams (for salads); tomatoes, 100 grams. This diet contains 37.5 grams of protein, 1990 calories. Adding three eggs the protein amount will go up to 55.2, 2210 calories. The same diet without egg yolks contains 32.1 proteins and 1874 calories.

THIRD DEGREE.

Maximum Protein Restriction.

This diet form can be prescribed for a very short time only, generally no more than three to seven days. It causes great harm to the protein reserve of the body and weakens the general condition and strength of the patient. For short periods of time where we want to heal some acutely diseased organs this disadvantage does not deter us from employing it, especially in cases of heart and kidney diseases, and in diabetes, obesity and gout.

THE TECHNIC.

In the realm of this diet form are all fast days, as prescribed in acute infectious and toxic gastrointestinal diseases, in severe stomach and duodenal hemorrhages, and in infectious diseases with high temperature. When we begin to give food again, the diet at first will not only be poor in volume and calories, but also in protein (for example, a little milk, or thick soup, or fruit juices). Under this form of diet belongs also the cautious feeding diet as used from time to time in the course of treating the previously mentioned diseases:

Examples (von Noorden).

1. Karell diet with whole milk:

Six hundred to 1000 grams of milk equal to 21 to 35 grams of protein, 20 to 34 grams of fat, 28 to 46 grams of carbohydrates, 0.9 to 1.5 salt, equal to 390 to 650 calories.

2. Karell diet with buttermilk:

Six hundred to 1000 grams of buttermilk equal to 22 to 36 grams of protein, 5.4 to 9 grams of fat, 23 to 38 grams of carbohydrates, 0.9 to 1.6 of salt equal to 234 to 390 calories.

3. Pure fruit diet:

(*a*) Daily 1400 grams of apples equal to 6 grams of protein, 0.08 of salt, 745 calories.

(*b*) Daily 1400 grams of bananas equal to 19 grams of protein, 1.8 of salt, 1225 calories.

(*c*) Daily 100 grams of walnuts and 1000 grams of oranges equal to 17.8 of protein, 58.5 of fat, 22.5 of carbohydrates, 0.14 of salt, 718 calories.

4. Fruit, vegetables, white bread diet:

Five hundred grams of apples, 100 grams of dates, 100 grams of strawberry marmalade, 200 grams of cauliflower, 100 grams of spinach, 200 grams of white bread, tea, coffee, the whole diet containing 24.2 of protein, 8.5 of fat, 336 of carbohydrates, 1.74 of salt, equal to 5056 calories.

5. Fruit, potatoes, sour cabbage diet:

Mornings.	Coffee or tea, 300 grams of apples.
Second breakfast.	100 grams of orange (fruit meat).
Luncheon.	300 grams of potatoes, 200 grams of sour cabbage, 200 grams of apples.
Afternoon.	100 grams of orange.
Evening.	100 grams of dates, 200 grams of grapes, 200 grams of potatoes, equal to 220 grams of protein, 2 grams of fat, 216 of carbohydrates, 2 grams of salt, equal to 1724 calories.

The previously mentioned oatmeal and vegetable days for diabetics belong within the boundaries of the third degree of protein restrictions, as long as we do not intentionally add such proteins as eggs, glidine or roborat (vegetable proteins); also if in the vegetable diet we avoid protein rich material such as legumes, chestnuts, nuts, cereals and bread even in small amounts. If the most restricted protein-poor diet (only 25 to 35 grams nitrogenous material) has to be kept up for a long time it is very difficult to vary the diet. The main foods are potatoes, fresh vegetables and fruits to which enough butter, sugar, and honey should be added to bring the caloric content to the desired level. Most of the protein-poor diet forms are also salt-poor. A diet which contains the above mentioned foodstuffs and which belongs to the diet forms 4 and 5 follows:

6. **Greatly restricted low-protein diet:**

Mornings.	Coffee, tea, 50 grams of whole wheat bread, 30 grams of oatmeal, 50 grams of marmalade.
Second Breakfast.	100 grams of orange.
Luncheon.	Thick soup, 200 grams with vegetables, such as celery, tomatoes, 300 grams of potatoes, 200 grams of sauerkraut, 200 grams of apples.
Afternoon.	100 grams of orange, coffee, tea.
Evening.	100 grams of dates, 200 grams of grapes, 200 grams of potatoes,, 100 grams of whole wheat bread. For the whole day 150 grams of butter, not salted, 50 grams of sugar, the whole diet containing 38 grams of proteins, 129.4 grams of fat, 440 grams of carbohydrates, 4.1 grams of salt. 3160 calories.

Indications for use:

(*a*) *Acute kidney diseases* and *exacerbations of chronic kidney diseases,* especially *uremia:* Complete fasting or only

sugar water, sugar-rich fruits and fruit juices allowed, later passing to other diet forms.

(*b*) *Subacute or chronic dropsy in kidney and heart diseases:* Water and salt-poor diet, also protein-poor (such as Karell days or fruit days intervening).

(*c*) *Obesity:* Start with Karell days (whole milk or buttermilk); later alternating periodically with water and protein-poor days (low caloric) such as fruit or vegetable days.

(*d*) Gout and uric acid.

(*e*) *Diabetes:* Fast days at the beginning of treatment of very severe cases and in threatening coma; also before or after oatmeal or other carbohydrate diet. The oatmeal and vegetable diets are very poor in protein.

(*f*) *Intestinal catarrh:* Fruit juices and subsequently pure sugar solutions. Daily, a quantity of 200 to 300 grams of sugar in water, as the only food, is very efficient in the treatment of acute gastroenteritis; the diarrhea stops in one to two days. After three to four days rice, about 100 grams, may be added, later allowing a normal diet.

(*g*) *Urticaria* and similar conditions, such as *erythema gyratum* and *Quincke's edema* (*angio-neurotic edema*).

The following diet is useful here:

One kilogram of dates as the only food is equivalent to 19 grams of nitrogenous substances, 720 grams of carbohydrates, 3030 calories; or rice, 200 grams; Palmin, 200 grams; sugar, 200 grams, yielding 3400 calories may be used.

9. THE PURIN-FREE DIET.

Purin bodies are derived from nucleoproteids which are contained in the nuclei of animal cells. The gastric juice splits the nucleoproteids. Tryptic digestion further splits up the

nuclear portion, in protein and nucleic acid, phosphoric acid and purin bodies. The amount of purin bodies present depends on the amount of nuclear material present in an organ. Glandular organs contain more of it than does the muscle. Purin bodies are also contained in yeast, in cereals, and in legumes. Other purin-containing foodstuffs are meat, meat extracts, liver, spleen, pancreas, thymus, kidneys, dry legumes, some of the fruits, such as chestnuts, almonds, and among vegetables, spinach.

Milk, vegetable milk, such as almond milk, cheese, bread, most of the cereals, fresh legumes, fruits, and potatoes can be used as purin-free foods, containing a minimum of purin bodies.

Below is a table (J. Koenig) giving the amount of purin nitrogen contained in the different foodstuffs commonly used in the normal diet.

The amount of purin nitrogen contained in 100 grams of the following substances:

Beef	0.052	Cheese	0.0001
Chicken	0.052	Dry lentils	0.162
Turkey	0.050	Dry beans	0.270
Pork	0.048	Spinach	0.024
Veal	0.046	Fresh peas	0.027
Mutton	0.039	Fresh lentils	0.054
Rabbit	0.038	Almonds	0.83
Sweetbreads	0.402	Chestnuts	1.639
Liver	0.099	Peanuts	3.26
Ham (smoked)	0.46	Hazel nuts	0.989
Wheat flour	0.0065	Meat broth	0.045
Rice	0.0298		

Foods containing high percentages of purin bodies are contraindicated in kidney diseases, in gout, in cases of rheumatic arthritis, and to some extent in diabetes.

An example of a diet poor in purin bodies follows:

Breakfast. Milk, sweet butter, stewed fruits, cereals, and cream.

Luncheon. Cream soups, boiled chicken or fish, vegetables, light desserts, stewed fruits and cheese.

Dinner. Like luncheon, limited amount of bread, no alcoholic beverages; mineral waters, as Fachinger and Vichy.

The Easily Digestible Diet (Poor in Extractive Substances).

This diet contains all dishes which are included under the smooth diet. In addition it contains all food preparations which are suitable in stomach diseases; dishes not allowed for the gouty and nephritic patients are excluded.

Prohibited: All the seasoned and too fatty dishes, tough or rare meats, canned products and game, brains, sweetbreads, liver, kidney, sharp cheese, raw vegetables, too concentrated meat broth, coffee and milk, alcoholic beverages.

Examples of such diet:

First Breakfast. Cocoa or milk, or milk tea with butter and whole wheat bread.

Second Breakfast. Two soft boiled eggs, or 50 grams of lean ham, or milk dishes.

Luncheon. *Soups:* Only thick or vegetable soups. *Meats:* Boiled beef, fish, chicken (roasted or stewed), veal, lean pork, plain omelet. *Vegetables:* Spinach, lettuce, mashed potatoes, carrots, artichokes, green vegetables boiled in salt water with fresh butter, rice. *Sauces* with very little fat and without vinegar. *Desserts:* Light soufflés, puddings made of flour, rice, farina, tapioca, sponge cake. *Fruits:* Fruit sauces, stewed fruit, raw fruit.

Afternoon. Cocoa, milk, milk tea with butter and rolls or wheat bread or fermented milk (sour milk, kephyr or yoghurt).

Dinner. Fish with vegetables or eggs and a glass of milk or cocoa, or a milk dish with egg yolk, or a vegetable dish such as pudding, or eggs au gratin, or plain omelet. *Dessert:* Cakes, cream cheese.

This diet form can be regarded as very suitable for the organism as a whole and is the form used at health resorts, such as Carlsbad, in combination with the water cure treatment.

This diet may be prescribed in all gastrointestinal diseases, where there is no need for specific directions by the physician. It is also used as a subsequent diet in the treatment of acute gastrointestinal diseases. In ulcer treatment it corresponds to the fourth week of the ulcer diet. In the treatment of gout, nephritis, diseases of the thyroid, neurasthenia and disturbances of the circulatory system, if the digestive organs are in good shape, it is the diet of first choice. As in the semisolid diet, when the extractive substances are excluded, meat can be replaced by fish or egg omelets and the diet can be made salt-poor also by using very little salt (about 2 grams a day) for the allowed dishes. Where salt is to be completely excluded even bread must be replaced by a salt-free bread. Generally 100 to 120 grams of meat is the correct amount per day. Patients who are used to larger meat quantities should be given instead, a dish made of one to two eggs and vegetables, as an entrée.

10. THE VEGETARIAN DIET.

We distinguish two forms of vegetable diet, the strictly vegetarian one, which excludes every kind of meat and even the products of living animals, as milk, eggs, cheese and butter; and mild vegetarian diet, which prohibits only meat, while other products and preparations of meat, as broth, gelatine, animal fat, bacon, marrow and the products of living animals, as milk, eggs, butter and cheese are permitted.

The first form only is the real vegetarian diet, while the second may be termed lacto-vegetarian or ovo-lacto-vegetarian diet. The pure vegetarian diet is very poor in

proteins and fat and has the disadvantage of being twice as bulky as the ordinary mixed diet. The greater volume and weight burdens the gastrointestinal tract, especially the stomach. This is why the food should be divided into equal proportions during the day and not containing, as in the mixed diet, two-thirds to three-fourths of the whole food in two meals. The vegetarian should have four meals at the very least. The caloric amount even with this great quantity of food is reduced considerably so that loss of weight is the natural consequence. A short period of the vegetarian diet would not be injurious even with the protein and caloric content reduced. Frequently, just because of the small protein content, it is prescribed in acute kidney diseases, in threatened uremia (sometimes as fruit days), and also in weight-reducing treatments. The vegetarian diet days are taken up in the chapter on Diabetes. Vegetarian diet days employed over a long period should be regulated in accordance with the needed caloric amount so that the protein content would reach 85 grams a day.

Let us consider five purely vegetarian diet forms: One purely liquid diet; one liquid semi-solid diet; two diets very rich in calories, and one diet of very limited caloric content. The following are to be considered only as examples and not as regular forms of fixed diet.

1. **Pure Liquid Vegetarian Diet** (von Noorden).

This diet may be divided in two-hour meals. Two liters of Soyama milk, 30 grams of oatmeal flour for soup, 30 grams of lentil flour for soup, 60 grams of Palmin fat. Equal to 2049 calories.

2. **Pure Vegetarian Diet in Liquid Semi-solid Form.**

In the morning.	300 grams of Soyama milk, 30 grams of cocoa, 30 grams of sugar.
Second breakfast.	30 grams of oatmeal and 30 grams of Palmin as soup.

At noon.	40 grams of green rye flour and 30 grams of Palmin fat as soup; 200 grams of mashed potatoes with 100 grams of Soyama milk, 30 grams of Palmin fat, 50 grams of spinach, 10 grams of Palmin fat, 20 grams of maizena flour, 200 grams of Soyama milk and 20 grams of sugar; as dessert, 200 grams of apples and 20 grams of sugar as sauce.
In the afternoon.	300 grams of Soyama milk, 30 grams of cocoa and 30 grams of sugar.
In the evening.	A milk pudding of 30 grams of farina, 30 grams of Soyama milk and 30 grams of sugar, 200 grams of apples with 20 grams of sugar as sauce.
Before retiring.	30 grams of oatmeal with 20 grams of Palmin as soup.

Making a total of 3360 calories.

3. Vegetarian Diet Very Rich in Calories.

Main foods: Bread, potatoes, fruits and fats.

For breakfast.	Coffee or tea, 150 grams of white bread.
Second breakfast.	100 grams of rye bread, 150 grams of apples or other fruits.
At noon.	30 grams of barley as soup; 400 grams of potatoes, 200 grams of sauerkraut, 50 grams of lettuce, 50 grams of walnuts, 50 grams of figs, 200 grams of apples, 150 grams of rye bread.
In the afternoon.	Coffee or tea, 100 grams of rye bread, 40 grams of marmalade.
In the evening.	30 grams of cocoa, with water and sugar, 200 grams of green peas, 50 grams of boiled rice, 100 grams of rye bread, 30 grams of apples, 40 grams of Palmin fat.

For the whole day, 4200 calories.

4. **Same as No. 3 only Poorer in Proteins.**

For breakfast.	Coffee or tea, 100 grams of whole wheat bread, 40 grams of oatmeal as porridge, 40 grams of marmalade.
For luncheon.	50 grams of lentils as soup, 150 grams of string beans, 200 grams of potatoes, 100 grams of tomatoes as salad; 300 grams of apples, 100 grams of white bread.
Afternoon.	Coffee or tea, 100 grams of whole wheat bread, 40 grams of marmalade.
In the evening.	200 grams of potatoes, 150 grams of cauliflower, 50 grams of noodles, 100 grams of stewed prunes, 100 grams of whole wheat bread.

For the whole day 50 grams of sugar, 100 grams of vegetable fat. Total of 3590 calories.

By the addition of 50 grams of nuts, 500 grams of Soy-ama milk and 23 grams of glidine we reach 4420 calories.

5. **Pure Vegetarian Diet (Low in Calories).**

For the morning.	Coffee or tea without sugar, 100 grams of whole wheat bread, 200 grams of fruit.
Noon.	40 grams of barley, as soup; 200 grams of potatoes, 150 grams of cauliflower, 200 grams of tomatoes or cucumbers, 200 grams of fruit.
Afternoon.	Coffee or tea, without sugar, 200 grams of fruits.
For the evening.	100 grams of whole wheat bread, 200 grams of potatoes, 200 grams of fresh green peas, 300 grams of asparagus, 200 grams of fruits of any kind.

Total of 1555 calories. This last diet contains 57 grams of proteins, 2 grams of fat, 315 grams of carbohydrates.

This low-caloric diet is very suitable in vegetarian reducing cures. The addition of 20 grams of fat will make this diet taste better, increasing it by 186 calories.

The meat-free diet is one in which we allow, in addition to vegetables, the products of living animals. Correctly speaking, instead of calling it ovo-lacto-vegetarian diet, we should apply the name of meat-free diet to it. There are conditions where, from a diagnostic or therapeutic standpoint, all meats and preparations of meat should be prohibited. Through the addition of milk in all its forms, milk products as cheese, butter and eggs, we have a diet which does not differ materially from the meat-containing diet, except for the protein content and the caloric amount. The difference lies for the most part in the taste. The meat-free diet is just as pleasing as the meat diet; the lack of meat, fish and broth is very seldom missed. The main points of advantage in the meat-free diet are: First, reduction in the ingestion of purin bodies (uric acid-producing materials); second, the absence of hemoglobin, which makes possible the detection of occult blood in the stool after keeping patients for few days on such a diet; third, reduction of putrefaction in the intestines.

The vegetarian diet is valuable therapeutically because it is poor in protein, rich in carbohydrates, and poor in calories and in salt. It improves the function of the intestines because it is rich in "roughage" (cellulose) and water. It is poor in purin bodies and thus less irritating to the stomach. We employ the vegetarian diet in uric acid diathesis (hyperproduction of uric acid in the body); in gout; in diabetes and obesity; in diseases of the kidney, heart and vessels, stomach and intestines, and diseases of the blood; in goiter; in nervous diseases, especially epilepsy; in convulsions of children, tetany of adults, hysteria and nervousness, and in alcoholism.

11. LEMON DIET.

In the last twenty years of the nineteenth century lemon days were prescribed for patients suffering with gout, kidney stones, and chronic rheumatism, but of late their use has not been so extensive. Good lemon juice contains from 8 to 10 per cent. acid; the amount prescribed is 250 cubic centimeters, taken in three doses, one hour after meals. It is laxative in its effect at the beginning, but after a few days tends to cause constipation. Lemon days are not indicated in conditions of sensitive stomach, in gastro-intestinal catarrh, hyperacidity, and in ulcerations. In the lemon-growing countries the natives take the juice of 5 to 7 lemons daily but it is always in diluted form. It is doubtful whether these lemon days have any real positive therapeutic effects. Lemon juice added to foods is certainly refreshing and very valuable in disturbances of the stomach, as for example, in alcoholic excess, but the lemon day lacks any real scientific basis. The successes reported are probably due to mere suggestion.

12. FRUIT DIET (GRAPE DIET).

By a fruit diet we mean a diet form in which at least one-half of the caloric value is furnished in the form of fruits. Where smaller quantities are given we call it a diet rich in fruits, not a fruit diet.

The fruit diet may be given as an addition to the regular diet form; a good example is the old well-known *grape diet,* given in addition to the usual food. The routine is to start with 1 to 1½ kilograms of grapes, increasing this amount up to 3 to 4 kilograms a day. Often 2 to 2½ kilograms is found sufficient. The following distribution is the most useful: Morning—500 grams; 11 o'clock—500 to 1000 grams; 5 P.M.—500 grams; 10 P.M.—500 grams.

This form of diet was usually given in the various grape-growing regions: in Germany—Rudesheim, Wiesbaden, Badenweiler; in Austria—Arco, Bozen, Gries, Meran; in Switzerland—Montreux, Vevy.

In olden times the fresh pressed juices were given as well. About 20 per cent. of the nutritive substances, especially sugar, remained in the residue if the press was not heavy enough. The juice was preferred, because experience showed that too great an amount of grapes gradually injured the lips, tongue and gums, producing inflammation, while the drinking of the juice never caused any such harmful sequelæ. The skins and seeds should not usually be eaten on account of the resultant mechanical irritation of the stomach and intestines. On such grape days we choose very tender grapes that are rich in juice and sugar, they contain 17.5 per cent. sugar, 0.95 per cent. nitrogenous substances, 0.6 per cent. acid (especially wine acid) and 0.4 per cent. mineral substances. Two kilograms of grapes contain about 315 grams of sugar, 9 grams of nitrogenous substances, 11 grams of wine acid, 7 grams of mineral substance, totaling about 1350 calories. This diet is very poor in protein and rich in mineral substances. The carbohydrates, of which 90 per cent. is sugar, predominate. Sugar has a very high food value and gives the grapes the valuable property of reducing the protein decomposition.

In employing the diet, it is important not to begin by giving immediately a large quantity of grapes, as we are probably dealing with people who are not used to large amounts of raw fruit. On the contrary, too much at once will cause the patient to complain of a feeling of pressure, colic, diarrhea, gas formation, and other irritating symptoms. Milk and milk derivatives do not go well with grapes, nor are great amounts of green vegetables and strong acids, such as vinegar and lemon, suitable. White bread, zwieback, whole wheat bread, eggs, cheese, cereals,

soups and puddings of legumes, boiled potatoes, rice, meat, butter, and ham present a large choice of foods which go well together. Very little water and small quantities of tea, coffee, cocoa, or wine are prescribed.

INDICATIONS AND CONTRAINDICATIONS.

1. *Effects on the Stomach.*—In severe organic stomach diseases, grape days should be avoided. On the contrary, in cases of nervous dyspepsia, where a complete change in diet is necessary, this treatment is found to be useful. Grape juice treatments are most successful where no abnormal fermentation exists and good evacuation of the stomach is possible. In cases of hypo- and hyperacidity, also in stomach ulcer, grape juice may be added to the diet. The grape juice treatment goes well with the semi-solid diet in addition to zwieback, toast, soft boiled eggs, mild fresh cheese, and butter.

2. *Effects on the Intestines.*—The grape diet is not indicated in the diarrheic conditions, but on the contrary is very efficacious in chronic constipation, especially where liver enlargement is present with a tendency to piles. Fresh pressed juice should be used here, because of the tannin contained in the fruit skins, which sometimes produces constipation. However, where grapes are taken in small amounts only, *e.g.,* (one kilogram of grapes eaten with skins and seeds) the mechanical action in the intestines will counteract the effect of the tannin. Gas formation during grape days may be immediate or delayed, the immediate occurring right after eating, and the other coming on two to four hours after meals; in the latter case gas formation is due to the fermentation of the sugar under the influence of fermentative agents in the lower intestines. The appearance of fermentative dyspepsia contraindicates any fruit diet.

3. *Grapes in Overfeeding Diet.*—Because of the caloric value of the daily grape quantity taken (two kilograms, equal to 1350 calories) grapes will be found of great advantage in the overfeeding diet. They are useful in cases of tuberculosis of long duration, and also in cases of young patients with incipient pulmonary infections.

4. *Grapes for Obese Individuals.*—We can also make use of grapes in reducing cures, but here they should replace other foods instead of becoming an addition to a normal diet as in overfeeding treatments. Lean meat and two kilograms of grapes make a useful reducing diet. Grape sugar protects the protein reserve of the body. Other fruits as apples, pears, strawberries with their smaller sugar and caloric value are still to be preferred in the reducing cures.

5. *Kidney Disorders.*—Grape days because of their low nitrogen and salt content and excellent caloric value are useful in the dietetic treatment of kidney diseases. Instead of grapes other fruits may be taken. Fruits do not have a positive healing power on the kidney, but are very helpful when combined with a diet correspondingly low in nitrogen and salt.

6. *In Diseases of the Lower Genito-urinary System.*—Grape or other fruit days possess the property of being able to change the urinary reaction to alkaline. One-half to 1 liter of fruit juice is readily taken as a table drink. In catarrh of the bladder and urethra grapes tend to provoke a burning feeling. In the latter cases such fruits as apples, pears, cherries, oranges and bananas are more suitable.

7. *In Gout and Kidney Stones,* fruit diet of any kind is very suitable. By using half of the caloric requirement in the form of fruit we can arrange a diet poor in purin bodies. Continuous use of fruits in such cases is very useful. In

uric acid kidney stones the effect on the urinary reaction is very important. Several authors have described the uric acid dissolving properties of a diet rich in fruits.

8. *Circulatory Disturbances.*—In weak conditions of the heart, in arteriosclerosis, in hardened kidney with hypertension, the fruit diet is often of great value, although the swallowing of air during eating, or fermentation frequently makes its use inadvisable for such cases. In other cases, it is contraindicated because of the large quantity of liquids contained in fruits.

9. *Liver Diseases.*—In disease of the liver, grape days have generally been avoided probably because of the fear of excessive sugar production. A transient glycosuria (non-diabetic) is usually the result of eating one kilogram of grapes (180 to 200 grams of sugar). It is well to watch very closely, on account of a possible real diabetes, those patients who eliminate sugar after eating this amount of grapes. In severe liver insufficiency, carbohydrates, especially fruit juice, seem to be a proper diet. In liver cirrhosis, good effects have been observed following fruit diet used in addition to the regular restricted nitrogen and low-salt diet. In jaundice due to the obstruction of the bile duct, whether in the catarrhal form or due to stones, grape or other fruit days seem very efficacious. Raw fruits such as bananas, stewed fruit and fruit juices (of grapes, oranges, pineapples), 1 to 1½ liters daily are useful. In gall-stones the peristaltic stimulating diet with fruits is very advantageous. It is contraindicated in acute inflammatory conditions, as gall-bladder inflammation. The banana is the only fruit which is nearly equal in importance to grapes.

FRUIT AS THE ONLY FOOD (FRUIT DIET).

Fruit as the only article of diet leads to undernourishment since the caloric requirement of the body is too high to be satisfied by fruit alone. Fruit cannot give the requisite nitrogenous substances, and it also lacks some of the protein builders. Even the compounds of mineral substances are present in sufficient amounts. The combining of fruits and nuts gives us a more valuable diet. Thus, fruits alone can replace the normal diet only for a very short period of time. In choosing fruits the state of the patient's digestive organs and his taste should be considered; still the caloric value, water and mineral content are the most important consideration. In kidney diseases and in acute nephritis and uremia, von Noorden recommends days of pure carbohydrate feeding. Raw fruits and fruit juices are best for this purpose. In circulatory disturbances fruit can replace the Karell milk diet (1000 to 1500 grams of fruit). The banana seems to be the most valuable fruit on account of its high content of diuretic potassium salts. The banana is poor in water and cellulose, and its carbohydrates are very easily absorbed.

In obesity three or four fruit days at the beginning of a reducing cure will prove just as suitable as Karell days. At noon and in the evening fruit may be replaced by vegetables—cucumbers or tomatoes. One such day in the week on the latter diet will assure success. Using the same system in gout and kidney stones, the excretion of uric acid is increased, and one such day each week will tend to prevent new accumulations. In acute diseases with fever, as pneumonia and erysipelas, the only food given is 1500 to 2000 cubic centimeters of grape juice, equal to 1100 to 1400 calories. In intestinal catarrh, even in ulcerative colitis, the fresh sterilized grape juice is used. The diarrhea may get worse in the beginning due to the great sugar content,

but it will change to constipation after a few days. In diabetes mellitus, von Noorden recommends fruit days instead of oatmeal days during carbohydrate treatment of diabetes (500 to 1200 grams a day). Lately he has employed single fruit days preceded or followed by vegetable days, especially in severe cases. Bananas, strawberries and apples are given, coffee, tea and alcohol are also allowed.

13. OATMEAL DIET.

Quite by accident, von Noorden found that diabetic patients who suffered from gastrointestinal disturbances, when given oatmeal soups, eliminated less sugar than was the case under a more restricted diet. Thus oatmeal days came into use, and they are now being often prescribed.

On typical oatmeal days the patient is given 250 grams of oatmeal, *i.e.,* 155 to 165 grams of carbohydrates in the form of soup or porridge, with the addition of 200 to 300 grams of butter, 100 grams of vegetable proteins, and 5 to 8 eggs. Coffee, tea, lemon juice, old red wine or brandy should be prescribed. Before the oatmeal days, a diet restricted to vegetables for one or two days is advisable. Sometimes a fast day is indicated. Sugar elimination increases the first day, but soon sugar and acetone elimination decreases. The best results are obtained in the most difficult cases, namely, those of young diabetics. It is excellent to counteract impending coma.

Von Noorden recommended vegetable or fast days before and after the oatmeal days. No other carbohydrates but oatmeal were used on such days. The transition to a regular diabetic diet should be gradual; first vegetable days, then the addition of meat and, later, very careful addition of carbohydrates. No meat should be given on the oatmeal days and among the vegetable proteins glidine with boiled eggs are found to be most suitable. The

oatmeal-butter diet sometimes provokes diarrhea. Ten drops of tincture of opium given twice daily or calcium carbonate is found successful in combating it. The substitution of bread and cakes made with oatmeal has not been successful.

When should oatmeal days be prescribed? In cases of slight glycosuria (diabetes), in the case of slight diabetes which runs an unusual course, and especially when the patient becomes tired of the regular diabetic diet. It serves as a welcome variation in these cases, and the oatmeal days may in turn be replaced by other flour days. Periods of oatmeal days are very efficacious before operations, during complications of acute infectious diseases and in stomach or intestinal catarrh. Here it is necessary to give very small amounts on account of the condition of the digestive organs. Oatmeal days are most effective in severe cases of diabetes and in precomatose states to reduce the acetone formation. Where it is found that the oatmeal days are effecting suitable reduction of sugar and acetone, they may be prolonged for several weeks.

Oatmeal days and a pure carbohydrate diet are advisable also in intestinal protein putrefaction, in gout, and in some skin diseases such as psoriasis and arthritic eczema.

14. MILK DIET.

The milk diet is the oldest form of dietetic treatment. It was first described as far back as the seventeenth century. Ph. Karell in 1865 was the first to bring it into extensive use. A real milk diet consists only of milk or milk derivatives. Adding 1000 or 1500 cubic centimeters to an ordinary diet, such as is given in tuberculosis, anemia, or to old people does not constitute a "milk diet." A quart of milk adds 35 to 52 grams of protein and 600 to 950 calories to the diet.

We distinguish between a pure or exclusive milk diet and a non-restricted milk diet (carbohydrates, such as cereals, sugar and fruits in addition to the milk).

EXCLUSIVE MILK DIET.

The exclusive milk diet can be used where we intend to reduce, to preserve, or to increase the body weight.

(*a*) The restricted or pure milk diet, as Karell employs it, is prescribed in decompensation of the heart. One quart of skimmed milk is equal to 390 calories. Starting with 600 grams we may increase this amount to 1000 or 2000 cubic centimeters (30 to 60 grams of protein and 390 to 780 calories). This constitutes a strictly reducing diet. The four degrees of the Karell treatment are:

		Proteins.	Fat.	Carbo-hydrates.	Salt.	Calories.
1.	600 grams =	21	20.4	27.6	0.80	390
2.	1000 grams =	35	34	46	1.50	650
3.	1500 grams =	52	51	69	2.30	975
4.	2000 grams =	70	68	92	3.00	1300

The strict milk diet is indicated in stomach diseases, in gastric ulcers, after abdominal operations, and in vomiting of cerebral origin. Not as the real Karell treatment, but as Karell days, milk days of 1000 to 1500 cubic centimeters are indicated once a week in gout, where purin bodies are contraindicated; in obesity, because of the low caloric value of milk, and in heart and kidney disorders, because of its low water and salt content.

(*b*) Theoretically milk, more than any other food, contains all the main foodstuffs necessary for the body. Milk is, however, iron poor, and the newborn child has stored in its body enough iron for its needs during the first half year of life, thus making the ingestion of iron-containing food unnecessary. The protein bodies of milk are poorly constructed so that milk is not very valuable in supplying the

protein needs of the organism. Iron compound should be added to a milk diet when prescribed for a long period. A man weighing 150 pounds living on milk alone would require the following quantities:

While resting in bed.....	3100 to 3600 c.c.	=	2100 to 2340	calories
Under slight exertion ...	3600 to 4300 c.c.	=	2340 to 2795	calories
Under medium exertion .	4300 to 5100 c.c.	=	2795 to 3315	calories
Under heavy exertion ...	5100 to 7000 c.c.	=	3315 to 4500	calories

Even though 7 to 8 meals of 300 cubic centimeters of milk are given daily, the caloric requirement for light exertion could hardly be reached. Although milk leaves the stomach very quickly, 300 to 400 cubic centimeters of milk tends to produce a heavy unpleasant feeling unless followed by a rest of 20 to 30 minutes. A pure milk diet would not be advisable for a man doing any work. If we wish to keep strictly to the milk diet an addition of cream two or three times daily will help us to correct some of the disadvantages of the pure milk diet. These disadvantages are the too frequent meals with the resultant heavy mechanical task for the stomach and intestines, the overworking of the heart and vessels in attempting to filter the fluids from the intestines through the kidneys, and the excessive amount of protein taken. A diet of two quarts of milk, 500 grams of cream (25 per cent. fat) contains the following elements:

	Proteins.	Fats.	Carbo-hydrates.	Salts.	Calories.
2 quarts milk	70	68	92	3.0	1300
500 grams cream	15	125	15	0.7	1542
Total	85	193	107	3.7	2842

(*c*) *Overfeeding with milk.* A pure milk diet is very impractical for increasing weight. At least a 25 per cent. increase in the quantities of milk prescribed above would be necessary to produce even slight results. Such overfeeding with milk would require five to seven quarts a day (300 cubic centimeters of milk every half hour from 7:00 A.M.

to 9:00 P.M.). It is fairly easy to carry out overfeeding through the milk-cream diet but this is not advisable. In cases where the nourishment was very low previous to the treatment, about three to four quarts a day (1950 to 2000 calories) supplied by milk alone will represent a real overfeeding diet.

(*d*) *Difficulties in using the milk diet.* The small amount given in the Karell treatment does not cause any difficulty. Only in prescribing a full milk diet or the overfeeding diet there are difficulties which are not easy to overcome.

1. Aversion to milk (idiosyncrasies). In such cases sour milk, yaourt, kephyr, milk puddings, to which coffee, tea or cocoa may be added, may be tried as substitutes.

2. Constipation, Feeling of heaviness, formation of gas, symptoms which are especially unpleasant in disturbances of the circulatory system. The addition of 40 to 100 grams of milk sugar daily is helpful.

3. Diarrhea. In many patients milk produces colic and diarrhea caused perhaps by the milk sugar and abnormal fermentative products contained in milk. In such cases kephyr, yaourt, sour milk, or buttermilk are found to be more easily digested with the addition of carbonate of calcium and pancreon.

4. Gastric disturbances. Should the milk be given raw or boiled? Raw milk, unless we know its source, is dangerous on account of impurities caused by bacteria. On the other hand, boiling and pasteurization impair the qualities of the milk, and long boiling seems to disturb some atomic groups which are responsible for the health of the tissues. (Barlow's disease.)

(*e*) *Diet with derivatives of milk.* Mare's milk has the advantage of being free from tubercle bacilli. Coagulated milk is useful when pure milk provokes stomach disturbances. Sour milk with the exception of the transfor-

mation of milk sugar in lactic acid does not differ in its effects from fresh milk.

Yaourt. The milk must be boiled before inoculation with yaourt bacilli so that pathogen bacteria are destroyed. The milk is evaporated to half the volume before inoculation. (Double yaourt—half a pint supplies as much food substances as one pint of milk.)

Skimmed milk and buttermilk are used in Karell treatment with more benefit than whole milk. Kephyr and koumiss contain alcohol, kephyr 1 per cent. and koumiss 3 per cent., both are employed in the treatment of tuberculosis.

THE ENLARGED MILK DIET.

It is often advisable to give foods which are derivatives of milk or which go very well with milk. In addition to the milk derivatives such as cream, buttermilk, milk sugar, and fresh cheese, we give cereals, rolls, eggs, sugar, tea, cocoa, chocolate, coffee, fruits, alcohol and even potatoes.

Suitable additions to milk diet.—Among cereals, the whole grain, rough and fine flour in the form of soups or different puddings, porridge or desserts, boiled with water or milk, with salt or sugar, may be given. To this class belong also noodles and macaroni, bread, wheat bread, zwieback, rye bread or whole wheat bread, the last being especially advisable.

Butter.—By the addition of butter the caloric value of the diet may be easily increased (as in soups, puddings or desserts).

Potatoes.—Used as potato soups and mashed potatoes. Both can stand the addition of a large amount of butter and milk or cream. Baked potatoes with plenty of butter are also a good addition to the milk diet.

Eggs.—As milk already contains enough protein, eggs are unnecessary and in some kidney troubles and intestinal

disturbances it is best tc exclude them from the diet. Eggs, however, are useful where it is desirable to enlarge the milk diet and especially in the preparing of desserts. Boiled or scrambled eggs are very seldom used.

Sugar.—Used to sweeten the liquid milk dishes, such beverages as coffee, tea, cocoa, or cakes, desserts, stewed or raw fruit. In constipation the use of milk sugar is very advisable.

Cream.—Like butter it increases the caloric value of the diet and thus allows us to reduce the amount of skimmed milk. It is used in beverages and with rice, noodles and potato dishes, desserts, ice cream and fruits.

Fresh Cheese.—Used with 25 per cent. fat containing cream and sugar, the combination represents 728 calories for 250 grams used (100 grams of cream and 20 grams of sugar).

Fruits.—Not everybody can stand fruit with the milk diet, but where this is possible raw or stewed fruit is always a very valuable addition.

Alcohol.—Alcohol in small amounts is very useful, best in the form of whisky or sweet wine.

The choice and the mixing of the additional food to the milk diet depend on the circumstances in each individual case. The nitrogenous substances and salts require special regulation. The advantages of the non-restricted milk diet over the pure milk diet are:

1. The volume of the diet is smaller, and it can be given in fewer meals.

2. The fluid intake is smaller, which is of advantage in circulatory disturbances and kidney troubles.

3. The salt content can be reduced better than in the pure milk diet.

4. The protein content of this diet is smaller than that of the pure milk diet.

5. The relation between carbohydrates and the other foodstuffs is of advantage, especially where the milk diet does not cover the caloric needs.

6. All the necessary foodstuffs and salts are in suitable proportion for the body nutrition, while in the pure milk diet they are not.

7. The diet is very varied and can be taken for a long time.

NON-RESTRICTED MILK DIET.

A few examples of non-restricted milk diet (von Noorden).

1. **Milk Soup-Butter Diet.**—Two quarts of milk; 80 grams of oatmeal; 120 grams of butter. Equal to 2225 calories.

2. **Milk, Cereals, Cream, Sugar and Butter Diet.**—Two quarts of milk; 200 grams of cream; 50 grams of oatmeal; 50 grams of rice; 20 grams of sugar; 80 grams of butter. Equal to 2885 calories.

3. **Milk Soup, Wheat Bread and Butter Diet.**—Two quarts of milk; 50 grams of oatmeal flour; 250 grams of wheat bread, and 200 grams of sweet butter. Equal to 3700 calories.

4. **Milk Soups, Whole Wheat Bread and Butter Diet.**—Two quarts of milk; 50 grams of oatmeal flour; 200 grams of whole wheat bread, and 200 grams of butter. Equal to 3733 calories.

5. **Milk, Eggs, Rice, Sugar, Cream, White Bread, Fruit and Butter Diet.**—Two quarts of milk; 2 eggs; 50 grams of rice; 40 grams of sugar; 200 grams of cream (25 per cent. fat); 250 grams of white bread; 300 grams of apples; 200 grams of butter. Equal to 4660 calories.

6. **Milk, Cheese, White Bread, Potato, Fruit and Butter Diet.**—Two quarts of milk; cheese dish; 250 grams of white bread; 400 grams of potatoes; 300 grams of apples; 200 grams of butter. Equal to 4765 calories.

7. **Buttermilk, Potato and Fruit Diet (Calorie Poor).**—Two quarts of buttermilk; 500 grams of potatoes; 500 grams of apples. Equal to 1460 calories.

8. **Milk, Potato, Oatmeal and Dessert Diet.**—One pint of milk, as beverage; 20 grams of oatmeal, ½ pint of milk, 60 grams of butter, and water prepared as a soup; 200 grams of potatoes, ½ pint of milk, 60 grams of butter as mashed potatoes; ice cream made of ½ pint of cream, 2 egg yolks, 80 grams of sugar and different kinds of fruit essence, as, for instance, orange juice; pudding made of ½ pint of cream, 2 egg yolks, 60 grams of vanilla sugar, 60 grams of chocolate. This gives a total of 105 grams of nitrogen substances, 340 grams of fat, 345 grams of carbohydrates, 5 grams of salt; food value 5000 calories.

INDICATIONS FOR MILK DIET.

1. *As Liquid Diet.*—Wherever a liquid diet is advisable, a milk diet may be used with the addition of cereal soups and puddings, and ice cream. It is mostly used in the treatment of stomach and duodenal ulcer and in acute infectious diseases with fever.

2. *Secretions and Anomalies of the Stomach.*—Hyperacidity and lack of acid in the stomach are alike treated with the milk diet.

3. *Intestinal Disorders.*—Generally, intestinal diseases are beneficially influenced by a milk diet, even though it produces constipation or diarrhea. In chronic constipation a milk diet in the form of kephyr or yaourt, with a considerable amount of whole wheat bread, provides a simple and inex-

pensive diet which may easily be prescribed for a long period of time. It may also be used in colitis and in enterotoxic neuritis. In diarrheal acute intestinal catarrhs, buttermilk is used for the adults just as in the treatment of children. Small amounts of buttermilk or three-days-old kephyr or yaourt are employed successfully in chronic diarrheal conditions (sequelæ of dysentery, in tubercular and intestinal ulcers and in Indian sprue).

4. *In liver and pancreatic diseases* milk diet is advisable if the flow of bile and pancreatic juice is not completely stopped. If this is the case, milk derivatives such as buttermilk, skimmed and sour milk are to be preferred. In obese people with liver congestion or the beginning of liver cirrhosis, a milk diet with the addition of cereals is of very great assistance.

5. *Pulmonary tuberculosis* was formerly often treated only with the milk diet. Nowadays, the kephyr diet is used more, although milk in tubercular patients with no appetite and fever is a good diet to start with before reaching the necessary caloric value and the addition of other necessary foods. A certain amount of milk (1 to 1½ quarts) and cream is usually added to the diet of the tubercular.

6. *Gout and Uric Acid Stones.*—Its lack of purin bodies makes milk the best food for the gouty. The exclusive milk diet, however, does not cover the food requirements completely. An exclusive milk diet may be used only one day or (at most) a few days each month.

7. *Obesity.*—As in gout a few milk days (Karell days) are very helpful on account of the poor caloric and water value. Skimmed milk or even buttermilk may be used with the addition of a few cereals and provides a pleasant and inexpensive reducing diet which may be carried out for a longer period of time.

8. *Kidney Disorders.*—In kidney diseases the milk diet, on account of its high water and protein content, is very seldom advisable. The non-restricted milk diet is more suitable here.

9. *In disturbances of the circulatory system* the advantages of the strict milk days are unquestionable. The use of milk is indicated here even more plainly than in kidney disorders.

10. *Nervous Diseases.*—Patients with certain forms of nervous dyspepsia, hysteria or neurasthenia are very successfully treated with the pure milk diet given over short periods only.

11. *Diabetes.*—Here the milk diet cannot be used regularly on account of the high protein and high milk sugar content. It may be employed in very light forms of diabetes complicated by obesity, circulatory disturbances, nephritis and edema. The amount of milk to be given will depend on the amount of sugar eliminated. Von Noorden used milk days as a substitute for oatmeal days, but never exceeded two quarts a day, and it had to be determined whether the milk was better taken care of than oatmeal.

12. *Diabetes Insipidus.*—This disease requires a low-salt diet, and salt-poor milk is found extremely useful.

15. GLAND DIET.

The employment of gland substances in the treatment of diseases is a recent development. The glands are desiccated or prepared in soluble extracts, and well standardized. Preparations of the mammary gland, ovaries, parathyroid, pineal, pituitary, placenta, suprarenal, testicle, thymus, thyroid, kidney, for oral or hypodermic use, are available, some of them having a very beneficial influence in the treatment of disease.

The Mammary Gland (all the elements of the gland

from lactating cattle) is used as an ovarian antagonist, especially in dysmenorrhea.

The Ovaries (three kinds of preparations: The whole ovary, ovarian residue, corpora lutea) are used as desiccated powder or in soluble extract form in ampoules. The first are used in ovarian insufficiency (puberty, menopause); the second to cause ovarian stimulation (amenorrhea or dysmenorrhea); the third in delayed or scanty menstruation, in vomiting of pregnancy and in dysmenorrhea.

The Parathyroid (controlling the calcium iodide of the body) is used in paralysis agitans, chronic toxemias, colitis.

The Pineal Gland is employed for somatic and sexual development.

The Pituitary Gland: The anterior lobe, in desiccated powder, is prescribed in sexual impotence, asthma, and in promoting the growth; the posterior lobe in solution (pituitrin) is used in the practice of obstetrics, for uterine inertia, in nocturnal enuresis with thyroid, also in postoperative tympanites; the whole gland is used in dystrophia adiposogenitalis.

The Placenta antagonizes the post pituitary in dysmenorrhea, menorrhagia and metrorrhagia.

The Suprarenal Gland: The secretion of the medulla part is adrenalin. The secretion of the cortex has not been isolated. The desiccated whole suprarenal gland is used in hypo-adrenia. Adrenalin increases the blood-pressure and is used in the treatment of surgical shock, hemorrhage, asthma, and as a diagnostic agent in suspected hyperthyroidism.

Testicle or orchic substance, comes also in soluble extract (Testogan) or in desiccated powder as tablets, used in sexual impotence of the male; also (in my experience) is useful in climacteric neurosis of the female.

Thymus is used in the form of tablets in Mongolian idiocy, in defective nutrition of children and as an antag-

onist to the ovaries; it is also prescribed in osteoarthritis. Since 1905 I used frequently the fresh gland with some success in epilepsy of children, also with great success in status thymicolymphaticus and in diabetes insipidus. Originally, I used one-half of the fresh calf sweetbread finely chopped with lemon juice and fresh caviar mixed, two portions on toast daily.

Thyroid Gland: Prescribed in cretinism and also used in dry forms of eczema, skin diseases (scalinous), for mentally defective children (in combination with thymus and pituitary), for undernourished children, in nocturnal enuresis (with pituitary), in anemia chlorosis, in delayed puberty.

Kidney: Nephritin, nephron, used in Bright's disease and also in nephrosis. Dieulafoy was the first to use raw pig kidneys in the treatment of Bright's disease and nephrosis. One pig kidney, thoroughly chopped, is well washed in cold water to free it from any urinary substance, and then macerated for 24 hours in cold water, and taken daily with the addition of a little lemon juice. The results are very satisfactory, causing good diuresis and disappearance of the albumin. I have used this treatment in about one hundred cases of acute nephrosis and Bright's disease between 1905 and 1917, and prepared a report. (Wien. Med. Woch., No. 7, 1918.) Instead of using the raw kidney, which was difficult to obtain in military hospitals during the World War, the chemical firm, Röder Raabe, Vienna, prepared for my use the desiccated kidney in tablet form (nephron), 6 to 8 tablets daily corresponding to one fresh kidney, which I used with very good results. It increased the diuresis, with disappearance of edema and progressive reduction in the albumin, in a very few weeks of treatment.

Pancreas, used as pancreatin or pancreon, in fatty stools and diarrhea, exophthalmic goiter, and also in all other secretion disturbances of the pancreas.

Raw Pancreas and Parotid Gland. I have used these for years in the treatment of diabetes with no very marked results, but a slight increase of carbohydrate tolerance.

Raw Cerebellum and Spinal Cord, prepared in the same way as described above, I have used in multiple sclerosis and tabes dorsalis without results.

Lately reliable firms offer all the fresh glands in a raw state for the doctor's immediate use. The hormone therapy has taken great proportions, and proven in some directions very successful. In all sorts of anemia, fresh and cooked liver is added to the diet, and the reports are very encouraging.

CHAPTER VIII.

RECIPES*

MILK.

1. Sweet Milk Soup.

Half a pint of milk with a dash of vanilla and one and one-half tablespoonfuls of sugar. Boil. Take one tablespoonful of Nestlé flour and stir it with a little cold milk, then add it to the boiling milk, finally thickening the mixture with the beaten yolk of an egg.

2. Salted Milk Soup.

Half a pint of milk with one-half teaspoonful of Kümmel and a little salt. Boil and pass through a sieve, then stir one tablespoonful of cornstarch with cold milk, add it to the previous mixture, boil again and thicken with one beaten egg yolk.

3. Mondamin Pudding (Cornstarch).

Boil half a pint of milk with three tablespoonfuls of sugar. Stir two-thirds of an ounce of Mondamin with cold milk, add it to the former and let it boil until the whole mass thickens. Put in a dish a layer of lady fingers or sponge cake, soaked in milk flavored with vanilla, almond or other flavoring, add a part of the boiling pudding, then a second layer of cakes, covering them again with Mondamin. Put on ice and serve.

4. Milk Ice.

Half a pint of milk with two tablespoonfuls of sugar. Boil, then cool. Add one tablespoonful of Maraschino and freeze.

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* W. Schlesinger, M.D.

5. Milk Tea (Swedish Tea).

Pour half a pint of boiling milk over one teaspoonful of tea.

EGGS.

6. Albumen Water.

Beat the white of an egg. Add it to seven ounces of water; leave it for an hour; strain through cloth. Add a tablespoonful each of sugar and orange or lemon juice.

7. Egg Drop.

Mix one whole egg and two egg yolks with three tablespoonfuls of milk, a little salt, three tablespoonfuls of Parmesan cheese and a little parsley. Put in a shallow butter-covered dish, bake for half an hour. Cool. Cut in pieces and cover with beef broth. (Instead of Parmesan, minced ham, boiled calf brains or sweetbreads may be used.)

8. Poached Eggs.

Drop three eggs, one after another, in boiling salted water to which lemon juice has been added. Boil for three minutes, then put in cold water. Drain and cover with tomato sauce.

9. Bacon and Eggs.

Broil one-quarter pound of bacon cut in thin slices, and pour over it two beaten eggs.

10. Dietetic Scrambled Egg.

Mix three egg yolks with three tablespoonfuls of milk, a little salt, two tablespoonfuls of grated Swiss cheese, and one ounce of minced ham. Put in a buttered casserole and steam, stirring continuously.

11. French Omelette.

Beat two eggs with a little salt. Put in a buttered pan and bake. Sauté one ounce of mushrooms with parsley in a little butter, then add to the omelette and turn it.

Instead of fine herbs, minced ham or spinach, asparagus tips, Parmesan or caviar may be used.

12. Chaudeau.

Beat one hundred cubic centimeters (three-quarter cup) of light old white wine and two egg yolks. Stir over heat until thick. Sweeten with sugar. (The Italians use Marsala wine instead.)

13. Chaudeau.*

Three-fourths of a cup (100 cubic centimeters) of white wine, two egg yolks with a drop of crystallose and a little lemon juice. Stir to a thick sauce over the fire.

14. Sweet Sauces.

(*a*) As hot cream sauce: Boil one-quarter of a pint of cream quickly, with a little vanilla. Add two beaten egg yolks and cook in double boiler. Sweeten with a tablespoonful of sugar (three drops of crystallose solution for the diabetic).

(*b*) As a cold sauce: The same can be cooled or frozen with one-eighth of a pint of whipped cream.

SOUPS AND SAUCES.

15. Beef Tea.

Mix one-half pound chopped meat with four tablespoonfuls of water. Steam for two hours in wide-mouthed bottle and strain through a piece of cloth. Give in milk, one tablespoonful from time to time.

16. Sauce.*

Brown three ounces of flour in the oven, mix with a little cold water, add more hot water, and boil. Add three ounces of fresh butter and one beaten egg yolk. This can be varied by using vegetable water or bouillon.

* For diabetics.

17. Hollandaise Sauce.

To use with boiled fish. Mix three-quarters of a cup of boiled water with a little lemon juice and spices and strain. Add three beaten egg yolks and, slowly, one third pound of melted butter. Cook in double boiler.

18. Sauce Mayonnaise.

To two egg yolks add four tablespoonfuls of finest olive oil. Mix and add salt and lemon juice.

19. Sauce Mousseline.

Beat two dessertspoonfuls of butter, three egg yolks, one-half cup of cream, juice of one-half lemon and salt. Cook in double boiler. After cooling mix with one-half cup of whipped cream.

20. Sauce au Gratin.

Stir two egg yolks with two tablespoonfuls of melted butter, added drop by drop. Mix with two tablespoonfuls of cream, add salt and two tablespoonfuls of Parmesan cheese. With this sauce we cover poached eggs or boiled cauliflower and sprinkle with Parmesan cheese, then bake in oven.

21. Béchamel Sauce.

Stir two tablespoonfuls of fine flour with one cup of cold milk or water and boil until thick. Add two tablespoonfuls of butter. Mix and boil again. This is used (*a*) with addition of salt, spices and white wine, as sauce; (*b*) to prepare au gratin vegetables (for this purpose make it thinner and add one egg yolk); (*c*) as a sauce for puddings, desserts, and (*d*) as a binding substance for chopped meat and vegetables.

22. Sauces for Desserts.

Hot cream sauce with the addition of chocolate, strong black coffee, roasted hazel nuts or fruit juices; for diabetics, pure fruit juice sweetened with crystallose.

23. Spinach Soup.

Clean and wash one-half pound of spinach, chop very fine with a little butter and salt, steam for a quarter of an hour, pour hot water on it, boil for a short time, pass through a sieve, add two egg yolks and mix with two ounces of whipped cream.

24. Tomato Soup or Sauce.

Stew tomatoes and strain. Add to one-half cup of juice one cup of water. Reheat. Add beaten egg yolk and butter. Cook over steam.

25. Barley Cream Soup.

Boil one-quarter pound of barley in water until very soft, then strain. Dilute the strained mass with bouillon. Boil again and add, before serving, one to two egg yolks and one-quarter pint of whipped cream to thicken.

26. Legume Soup.

Mix three tablespoonfuls of legume flour with cold water. Add one pint of boiling water, boil thoroughly. Add salt and two-thirds ounce of fresh butter.

27. Cheese Soup.

Boil one to one and one-half ounces of rice in soup, add salt, two dessertspoonfuls of butter, two egg yolks, one tablespoonful of cream to thicken, and spread with Parmesan. (For diabetics use only the amount of rice equivalent to one-half roll.)

JELLIES, ETC.

28. Aspic or Jelly.

Put one calf's foot, two pig's feet, one chicken, one pound of ham chopped with spices and salt in three quarts of cold water. Boil for five hours and strain. Allow the mass to cool, and skim the fat off. Allow the jelly to dissolve over slow heat. Add the beaten whites of three eggs and a little lemon juice. Boil again, and strain through a

very fine moist cloth. (White wine or champagne may be added.)

29. Sweet Jelly for Diabetic Desserts.

Boil two pig's feet, two calf's ears, in two and one-half quarts of water, to half the volume. Strain. Skim off fat. Add white of egg and a little lemon juice to make clear. Strain. Mix with one-quarter pint of white wine and five drops of crystallose solution and cool.

30. Strawberry Crème for Diabetics.

Mix three-quarter cup of whipped cream with three tablespoonfuls of unsweetened crushed strawberries, six drops of crystallose solution, a few drops of lemon juice, two tablespoonfuls of sweetened jelly (see Recipe No. 29) and let cool in a glass dish, finally adding fresh strawberries and whipped cream.

31. Almond Jelly.

Melt two tablespoonfuls of sweetened jelly (No. 29) or gelatine with three tablespoonfuls of very finely chopped almonds and two tablespoonfuls of crushed apricots with four drops of crystallose solution. Put on ice.

32. Almond Custard for Diabetics.

Two egg yolks, three-quarter cup of cream, two dessertspoonfuls of very finely crushed almonds, beaten over fire. Add six drops of crystallose solution, three-quarter cup whipped cream, two tablespoonfuls of melted sweet jelly (No. 29), and put on ice.

MEAT.

33. Raw Meat, Chopped, in Aspic.

Three ounces of tender, raw meat finely chopped and salted. Submerge for a second in boiling soup and after cooling in small molds put in jelly.

34. Chicken Purée Soup.

Put the neck, back, etc., of a chicken with skin and bones, chopped, in three-quarter quart of cold water. Boil for an hour. Strain. Roast the meat parts, breast and legs, and chop with a tablespoonful of boiled rice. Grind. Put the purée obtained in a casserole. Cover with strained soup and boil for a quarter of an hour. Pass again through a sieve. Warm and mix with two egg yolks and four tablespoonfuls of whipped cream.

35. Meat Hash.

Broil rare half a pound of tenderloin. Chop fine and pass through a sieve. Add three egg yolks and one tablespoonful of flavoring, a little salt. Cook in double boiler.

36. Meat Farcé.

Chop and grind one-half pound of roasted game or other roasted meats, adding a little water, pass through a sieve several times. Mix with a small piece of butter and two egg yolks to a soft consistency. (This can also be served cold in jelly.)

37. Chicken Soufflé.

Chop half a chicken or one-half pound of veal meat, raw, with one-quarter of a roll which has been soaked in milk. Add two egg yolks, salt and the beaten whites of three eggs, and bake in oven.

38. Pudding a la Richelieu.

Pass one-half pound of veal three times through meat chopper, the third time with a little milk-softened roll. Add two-thirds ounce of butter and one egg yolk and pass through a sieve. Beat one and two-third ounces of butter with two egg yolks. Add the meat mixture to it, salt, and finally add the beaten whites of two eggs. Put in molds and steam.

39. Fish Pudding.

Boil one-half pound of fish (fresh water fish) in salt water, remove bones, chop and grind with two yolks of eggs, one tablespoonful of Parmesan, two ounces of butter, three whites of eggs and cook over steam. Cover with Hollandaise sauce or with grated Parmesan.

40. Roasted Meat Finely Chopped (in Paper).

(*a*) Mix veal very finely chopped with one egg yolk and salt with a little softened white bread, patting it into the shape of a steak, place it on buttered paper and tie. Fry in hot fat for three minutes.

Beefsteak (in Paper).

(*b*) Salt one-third pound of beefsteak, cover with herbs, place in a little paper sack oiled inside, bind with string and fry three and one-half minutes in hot fat.

41. Ragout.

Cut veal, chicken, or tongue in small pieces and sauté in butter. To this add boiled pieces of cauliflower, one teaspoonful of truffles and mushrooms and heat for a short time in sauce No. 20. Add lemon juice, white wine and salt.

42. Hospital Steak.

Mix finely chopped veal steak with spinach. The spinach prepared as follows: Two tablespoonfuls of spinach, scalded, passed through a sieve and slightly dried in an oven. Add one egg yolk. Shape it in form of steaks and sauté in butter.

43. Ham Pancake.

Two whole eggs, three tablespoonfuls milk, one-half ounce flour. Make into pancakes and fill with very finely chopped ham, which may be mixed with warm sour cream (yoghurt).

VEGETABLE DISHES.

44. Spinach Boiled in its Own Juice.

Clean and wash very young spinach. Boil in an open pot without any water (except that which adheres to the leaves after washing); stir continuously to prevent burning. Pass through a sieve, add salt, and mix with egg yolk and whipped cream.

45. Potato Purée.

Boil one-half pound potatoes. Take off the skin. Cut in quarters. Pass through a sieve and add about one-quarter pint boiling cream. Add one ounce of fresh butter and stir over steam. Mix with one egg yolk and salt.

46. Spinach Omelette.

Boil one-quarter pound of spinach for a few minutes in salt water and pass through a sieve. To the beaten whites of two eggs, add two egg yolks and one ounce of melted butter. Stir into the spinach with a little salt and bake the whole in a pan. Fill with butter and stewed mushrooms. Instead of spinach, other fine herbs stewed in butter may be used with the eggs.

47. Cauliflower Pudding.

Soft boil a piece of cauliflower and pass through a sieve. Add two ounces of butter, two egg yolks, one tablespoonful of Parmesan cheese, one tablespoonful of sour cream, half a roll softened in milk, salt, and finally the white of two eggs. Bake for twenty minutes in a pudding dish. (The roll could be eliminated in diabetic diet.)

48. Cauliflower Pudding No. 2.

Mix two ounces butter with two egg yolks and two ounces of cauliflower purée. Add one tablespoonful of grated Parmesan and the beaten white of two eggs. Cook one-half hour in double boiler, turn out and cover with grated Parmesan. Serve with stewed green peas.

49. Spinach Pudding.

Take one-half pound of spinach, cleaned and washed, boil and pass through a sieve. Add one ounce of butter, three egg yolks, two tablespoonfuls of whipped cream, a little salt, white of three eggs and finally some chopped ham. Cook in double boiler.

50. Julienne Steak.

Soak in cold water over night two tablespoonfuls of Julienne (mixed dry vegetables). Soft boil in the same water. Chop fine and pass through a sieve. Add one tablespoonful of sauce No. 20, or one-quarter of milk-softened roll, salt, one egg yolk. Mix and shape into little steaks. Sauté in very hot butter.

CEREAL DISHES.

51. Rice Water.

Boil one tablespoonful of rice with one-half pint of water for twenty minutes. Strain and sweeten with one lump of sugar.

52. Quaker Oats.

Two tablespoonfuls of oats with one-half pint water, boiled to one-half of the volume and strained. Add sugar, cinnamon, and three ounces of whipped cream and mix.

53. Oatmeal Day for Diabetics (Two Meals).

Soft boil three ounces of oatmeal in one pint of cold water and strain. Mix half of the mass with one cup of water and one-half ounce of glidine. Bring nearly to a boiling point and add one ounce of fresh butter to it before serving, sometimes adding one egg yolk. Prepare the other half as pudding. Mix this mass with one egg yolk and 1 ounce of butter, sweeten with a few drops of crystallose, a little salt, flavoring, the white of two eggs and cook the whole mixture over steam. In six such meals

(three soups and three puddings) half a pound of oatmeal would be used, six eggs and six ounces of butter.

FRUITS AND OTHER DESSERTS.

54. Fruit Jelly.

To one-half pint of fruit juice add two tablespoonfuls of Mondamin (cornstarch). Boil till the mass starts to thicken, then put in a mold and on ice. Serve with sponge cake or lady fingers, covered with whipped cream.

55. Farina Pudding.

Boil carefully one tablespoonful of fine farina, rice or tapioca in one-half pint milk. Sweeten and thicken with two-thirds ounce of butter and one egg yolk.

56. Cold Pudding made of Farina, Rice, Tapioca.

Boil three tablespoonfuls of farina in one-half pint milk. While hot add to it two egg yolks and sweeten; pour into small molds, cool before serving, turn out, and cover with fruit juice or chocolate sauce.

57. Sweet Puddings made of Rice, Farina, Tapioca.

Boil rice, farina, tapioca in milk and sweeten. Mix with egg yolk, and add to it the white of egg. Bake in the oven or over steam. Cover with sauces, such as fruit juices, or cream, or sauce made of cocoa or chocolate.

58. Ham and Rice Pudding.

Boil one ounce of rice in soup. Add one tablespoonful of butter, one and one-half egg yolks. Mix. Add one tablespoonful of Parmesan and one ounce of finely chopped ham, salt and the beaten white of one egg. Cook over steam twenty minutes, spread with Parmesan and garnish with green vegetables.

59. Parmesan Pudding.

Mix finely two-thirds ounce of butter with one egg yolk, two-thirds ounce of Parmesan, two tablespoonfuls of sour cream and one ounce of flour. Add the white of the egg. Steam for quarter of an hour in buttered mold; when ready, garnish with green vegetables and chopped ham.

60. Biscuit Dough.

Beat to a foam four whole eggs, two egg yolks, one-third pound of sugar with one-quarter pound of fine flour. Add one and two-thirds ounces of melted butter. Put in biscuit pan and bake under moderate heat. Chaudeau or cream may be used with it.

61. Savarin.

To one-quarter pound of flour add two ounces of melted butter, three egg yolks, one-quarter ounce of yeast, one-eighth pint of milk, a little sugar and salt. Make a light dough, allow to rise and bake in small molds, then cover with fruit syrup made as follows: Boil together one-quarter pint water, three ounces of sugar, and orange skin. Add some orange juice and flavoring.

62. Cakes.

To one ounce of butter add one egg, one-half pound of flour, one ounce of sugar, one teaspoonful of baking powder. Make a dough of these ingredients and then cut out the cakes and bake.

63. Almond Cake.

To two yolks, very well beaten, add two-thirds ounce of finely ground almonds, four drops of crystallose solution and the beaten whites of two eggs. Bake in an omelette pan. Roll while hot and fill with sugar-free fruit and whipped cream. Allow it to get cold and cut in slices. A very suitable filling may be made of two ounces butter with the addition of one

egg yolk, four drops of crystallose solution and two dessertspoonfuls of finely ground almonds.

64. Hazel Nut Cake.

To three ounces of butter add three egg yolks, three tablespoonfuls of ground hazel nuts, three tablespoonfuls of ground almonds, a little lemon juice with skin, a few drops of crystallose solution to sweeten. Mix with the beaten white of three eggs and bake in oven. Finally garnish with whipped cream.

65. Coffee Tart.

Bake the almond bread dough (Recipe No. 80) in a small tart mold, then allow it to get cold. Cut horizontally and fill and cover with cream. The cream is made of one-quarter pint of strong black coffee, one-quarter pint of cream and three egg yolks stirred till thick over steam, five ounces of butter added. After this mixture cools, add 16 drops of crystallose solution.

66. Fruit Soup.

Chop fine three apples or pears or peaches, boil with lemon skin and cinnamon and strain. Boil the juice again with one tablespoonful of oatmeal boiled in water. Sweeten. Add one egg yolk and one to two tablespoonfuls of cream. Thicken.

67. Rhubarb Compote.

Clean rhubarb, cut in one inch thick pieces. Boil with water, lemon rind and sweeten with crystallose.

68. Apple Sauce.

Bake sour apples in the oven. Pass through a sieve. Add grated lemon rind, a little sugar. (Sweeten for diabetics with crystallose.)

69. Bilberry Tea.

Put one-quarter pint bilberries in a pint of water overnight. The next morning boil, strain and use as a cold drink.

70. Apricot Soufflé.

Mix one tablespoonful of sugar with one tablespoonful of apricots with the skin and stones removed. Add the white of one egg and bake in a small mold.

71. Strawberry Ice.

To one-quarter pint of unsweetened crushed strawberries, which were boiled in one-quarter pint of water, add two ounces of sugar; mix. Freeze and add one-quarter pint of whipped cream. Freeze again.

72. Almond Milk.

Skin one hundred sweet and two bitter almonds, grind well; leave in one and one-half pints of cold water for three-quarters of an hour. Press through cloth and sweeten as necessary.

73. Cocoa Custard.

Mix one ounce of cocoa with one-quarter pint of hot cream. After cooling, strain, and add two egg yolks and one ounce sugar. Stir until thick over steam. Add one-quarter pint of whipped cream and put on ice.

74. Coffee Ice Cream (for Diabetics).

To two egg yolks add one-quarter pint of cream, stir over steam, add two tablespoonfuls of strong hot coffee and five drops of crystallose. Freeze. Add two tablespoonfuls of whipped cream and again freeze.

75. Chocolate Pudding.

To one ounce of butter add two ounces of sugar and two yolks of eggs, beat. Add one ounce of softened chocolate and let it cool. Add some grated lemon rind and a little

lemon juice and the beaten whites of four eggs. Bake slowly in a porcelain dish greased with butter. (Just enough for one person.)

DESSERTS FOR DIABETICS.

76. Sweet Soufflé.

Beat two egg yolks with a little salt and two drops of crystallose, add the whites of two eggs well beaten. Bake in an omelette pan, cover with apple sauce, sweetened with crystallose.

77. Apple Pudding.

Mix a piece of butter with an egg yolk. Add a few drops of crystallose, a handful of chopped apples, a little lemon juice and grated rind, and the beaten white of an egg. Put in buttered pudding mold and bake in oven. The same recipe could be steamed and covered with Chaudeau for diabetics.

78. Cheese Pudding.

Mix one egg yolk with a piece of butter. Add a little potted cheese, rub through a sieve, and beat until smooth. Add a handful of chopped almonds, one tablespoonful of cream and finally the beaten white of an egg. Bake or steam.

79. Ham Pudding.

Beat one yolk. Add a little salt and beaten white of an egg. Bake in an omelette pan. After cooling, cut in very small squares. In the meantime mix a little butter with one egg, one tablespoonful of sour cream, and one ounce of minced ham. Mix well with the square noodles, put in a buttered mold, and bake it in the oven.

80. Almond Bread.

Grind five ounces of almonds, put them in a napkin in boiling water for five minutes, then add a few drops of citric

acid. Mix three ounces of butter with the almonds, three egg yolks, two whole eggs, a little salt, and knead one-half hour. Add five drops of crystallose, the beaten whites of three eggs, and bake in butter-greased paper forms. (May also be taken with Recipe No. 13, Chaudeau for Diabetics.)

81. Nut Desserts.

Bake the dough of the above described almond bread in fancy forms. The next day split the cakes and fill with whipped cream and ground nuts and a little crystallose and bake again in the oven. This filling may be made of whipped cream and crushed strawberries, a little lemon juice, sweetened with crystallose and garnished with fresh strawberries.

CHAPTER IX.

TABLES.

TABLE No. I.

(*a*) **Digestibility of Foods (Penzoldt).**

The following substances leave the stomach in from one to two hours:

100-200	grams	Pure water (30 Gm.–1 ounce).
200	"	Carbonated water.
200	"	Tea, plain.
200	"	Coffee, plain.
200	"	Cocoa, plain.
200	"	Beer.
200	"	Light wines.
100-200	"	Boiled milk.
200	"	Broth, with no ingredients.
200	"	Peptones, all kinds with water.
100	"	Eggs (soft).

The following foods leave the stomach in two to three hours:

200	grams	Coffee and cream.
200	"	Cocoa with milk.
200	"	Malaga wine.
300-500	"	Water.
300-500	"	Beer.
300-500	"	Boiled milk.
100	"	Eggs, raw or scrambled, hard-boiled or omelette.
100	"	Beef sausage.
200	"	Veal brains.
200	"	Sweetbreads (boiled).
200	"	Carp.
200	"	Haddock, boiled.
150	"	Cauliflower, boiled or as salad.
150	"	Asparagus.
150	"	Potatoes, boiled or mashed.
150	"	Cherries, stewed or raw.
70	"	White bread, fresh or old, dry or with tea.
70	"	Zweiback, fresh and old, dry or with tea.
50	"	Cakes.

The following foods leave the stomach in three to four hours:

230	grams	Spring chicken, boiled.
230	"	Partridge, roasted.
260	"	Pigeon, boiled.
195	"	Pigeon, roasted.
250	"	Beef, raw or boiled.
250	"	Calves' feet, boiled.
160	"	Ham, raw or boiled.
100	"	Veal, roasted warm or cold.
100	"	Beefsteak, roasted, warm or cold, lean.
100	"	Beefsteak, raw, chopped.
100	"	Filet.
200	"	Salmon, boiled.
72	"	Salted caviar.
200	"	Smoked fish.
150	"	Rye bread.
150	"	White bread.
150	"	Cakes.
150	"	Potatoes, boiled.
150	"	Turnips.
150	"	Carrots.
150	"	Spinach.
150	"	Cucumber salad.
150	"	Radishes (raw).
150	"	Apples.

The following foods leave the stomach in four to five hours:

210	grams	Pigeon, roasted.
250	"	Tenderloin beefsteak, roasted.
100	"	Smoked meats.
250	"	Smoked tongue.
250	"	Hare, roasted.
240	"	Partridges, roasted.
250	"	Goose, roasted.
250	"	Duck, roasted
200	"	Herrings.
200	"	Peas (mashed).
150	"	String beans (boiled).

TABLE No. II.

(*b*) The percentage of Proteins, Fats and Carbohydrates contained in the main articles of food (Pfeiffer), and their caloric value (J. Koenig) is as follows:

Caloric requirements of body at rest and under exercise:

30 to 35 calories for 1 kg. body weight at bed rest.
32 to 35 calories for 1 kg. body weight at room rest.
35 to 40 calories for 1 kg. body weight at light exercise.
40 to 50 calories for 1 kg. body weight at average exercise.
50 to 60 calories for 1 kg. body weight at heavy work.

	Calories per 100 Gms.
Proteins	410
Fats	930
Carbohydrates	410
Alcohol	700
Acetic acid	350
Lactic acid	370
Citric acid	250

ANIMAL FOOD.

Meats.	Proteins.	Fats.	Carbo-hydrates.	Calories per 100 Gms.
Beef (raw)	21.40	....	....	100-306
Beef (boiled)	37.73	2.8	....	176
Beef (fried) fat	32.21	....	....	...
Beef (fat)	18.0	25.0	....	306
Beef (medium fat)	21.1	7.4	....	151
Beef (lean)	20.5	2.8	....	110
Veal (raw)	18.88	1.105	....	91-178
Veal (fat)	19.5	10.5	....	178
Veal (medium fat)	19.8	5.5	....	131
Veal (lean)	20.0	11.0	....	91
Goat	20.6	4.3	....	124
Mutton (raw)	18.11	5.77	....	295-436
Mutton (fat)	14.5	33.6	....	436
Mutton (lean)	17.1	5.8	....	295
Pork, raw (lean)	19.91	6.3-41.3	....	141-436
Pork (fat)	12.7	41.3	....	436
Pork (medium)	17.6	24.0	....	295
Pork (lean)	20.1	6.3	....	141
Ham (salted)	22.32	8.68	6.38	...

	Proteins.	Fats.	Carbo-hydrates.	Calories per 100 Gms.
Horse	21.5	2.5	....	115
Hare	23.3	1.1	....	107
Rabbit	24.5	9.8	0.2	195
Venison	19.8	1.9	2.0	105
Chicken (fat)	18.5	9.3	....	167
Chicken (lean)	19.7	1.4	....	99
Turkey (medium fat)	24.7	8.5	....	180
Wild duck	22.6	3.1	....	131
Goose (fat)	15.9	45.6	....	489
Pigeon	22.1	1.0	....	100
Blood	18.1	0.2	0.03	76
Calves' brains	9.0	8.6	....	117
Sweetbreads	28.0	0.4	....	118
Lungs	15.2	2.5	0.56	88
Kidneys	18.4	4.4	0.38	118
Spleen	17.8	4.2	1.01	116
Liver	19.9	3.6	3.33	129
Tongue	15.7	17.6	0.05	228
Heart	17.5	10.1	0.31	167
Bone marrow	3.2	89.9	....	850
Calves' feet	23.0	11.3	....	200
Sausages.				
Salami	27.8	48.4	....	564
Frankfurters	12.5	39.1	2.5	425
Ham sausage	12.9	34.4	2.5	382
Blood sausage	11.8	11.5	25.1	250
Liver sausage	16.0	35.9	2.6	410
Fish (fat).				
Salmon	21.1	13.5	....	212
Eel (river)	12.2	27.5	....	306
Eel (sea)	18	7.8	....	145
Herring	15.4	7.6	....	134
Mackerel	18.9	8.8	....	156
Alse	21.9	12.8	....	209
Carp	18.2	7.0	....	140
Halibut	20.6	2.5	....	108
Turbot	18.1	2.3	....	96

Fish (lean).	Proteins.	Fats.	Carbohydrates.	Calories per 100 Gms.
Brook trout, sea trout, sole, pike, flounder, shell-fish, sander ...	17.1	0.5	....	77
Oysters	5.9-9.0	2.0	....	50-77
Lobster	14.5	1.8	....	82
Crawfish	16.0	0.5	....	77
Mock turtle	18.5	0.5	....	74

MILK.

	Proteins.	Fats.	Carbohydrates without sugar.	Calories per 100 c.c.
Human	1.2	3.5	7.0	...
Cow	3.50	3.40	4.60	65
Sheep	5.1	6.2	4.2	96
Goat	3.7	4.1	4.6	72
Mare	2.2	0.5	7.0	42
Ass	1.8	1.4	6.2	46
Reindeer	10.4	21.0	5.2	290
Sour milk	3.55	3.7	39-45	65
Yoghurt (not fat)	3.3	2.8	4.0	60
Yoghurt (fat)	4.0	25.0	7.0	280
Buttermilk	3.1	0.3	4.3	33
Kephyr (3 days old) ..	2.70	3.21	3.29	33
Koumiss (4 days old) ..	1.6	1.9	....	47
Condensed milk	12.0	10.0	53.0	300
Dry milk (fat)	25.1	26.8	37.0	504
Dry milk (half fat) ...	31.9	14.2	41.4	433
Dry milk (not fat)	33.5	1.6	50.0	357
Cream, 10 per cent.	3.5	10.0	3.5	122
Cream, 45 per cent.	3.0	45.0	3.0	443
Devonshire	3.2	57.4	3.2	560
Almond milk	3.3	8.1	1.1	93
Brazil-nut milk	2.9	10.7	0.8	115
Soyama milk	3.77	3.36	4.26	64
Soyama cream	2.50	30.0	1.0	293
Butter (sweet)	0.7	82.0	0.5	772
Butter (salted)	0.7	82.0	0.5	772
Butter (melted)	0.1	97.0	0.1	902
Vegetable fat	....	91.0	....	930

Cheese (very fat).	Proteins.	Fats.	Carbohydrates without sugar.	Calories per 100 c.c.
Gervais	14.2	42.3	....	450
Stilton	35.7	36.9	....	508
Strachino	23.4	34.0	....	412
Cheese (fat).				
Brie, Camembert	19.0	25.9	....	323
Swiss	29.5	29.7	5.0	403
Gorgonzola	26.0	30.6	....	398
Cheese (half fat).				
Gruyére	30.1	28.7	2.5	393
Cheese (little fat).				
Parmesan	40.9	19.3	1.2	354
Sour milk cheese.				
Potted cheese	16.9	6.2	....	135
Sheep cheese				
Roquefort	26.5	33.1	1.7	430

CEREALS

(Whole grain).

	Proteins.	Fats.	Carbohydrates.	Calories per 100 Gms.
Wheat	12.0	1.8	68.7	348
Barley	9.7	2.0	68.5	339
Oats	10.2	5.3	59.7	336
Maize (Indian corn)	9.4	4.1	69.4	361
Rice	7.9	0.8	76.8	355
Rye	11.2	1.6	69.1	356
Buckwheat	11.4	2.7	58.8	313
Flours.				
Wheat	10.7	1.1	74.7	350
Barley	9.1	1.4	75.3	359
Oats	14.4	6.8	66.4	395
Maize	9.6	3.1	71.7	362
Rice	7.4	0.7	79.0	360
Buckwheat	8.3	1.5	74.6	354

Breads.	Proteins.	Fats.	Carbo-hydrates.	Calories per 100 Gms.
Wheat bread	6.8	0.5	57.8	270
Whole wheat	8.1	0.7	47.6	235
Rye	6.4	1.1	50.4	243
Oatmeal	7.6	0.5	40.7	212
Barley	6.4	2.1	38.4	203
Maize	5.8	1.7	45.7	227

SUGARS AND SWEETS.

	Proteins.	Fats.	Sugars.	Calories per 100 Gms.
Honey (pure)	0.3	....	70-85	330
Honey (artificial)	....	....	80.7	331
Malt extracts	6.8	....	88-925	400
Calorose	....	....	77.82	...
Levulose	....	....	....	...
Dextrose	2.0	....	80	410
			(Saccharose)	
Bonbons	....	....	85-95	400
Honey	....	....	78	304
Fruit syrups	....	....	65-75	223
Fruit jellies	....	....	60-70	...
Chocolate	....	....	55-60	498
Raisins	....	....	55-62	270
Marmalades	....	....	55-75	...
Figs, Dates	....	....	45-55	...
Ice cream	....	....	40-55	...
Dry prunes, apples	....	....	35-50	258
Fresh stewed fruits	....	....	20-30	54-100
Grapes	....	....	14-20	69
Fruits (with stones) ...	....	....	10-13	47-52
Berries	....	....	5-8	16-36

VEGETABLES.

	Proteins.	Fats.	Carbo-hydrates.	Calories per 100 Gms.
Red beets	1.36	0.08	8.3	41
Carrots	0.95	0.25	10.03	40
Sugar beet	1.2	0.1	15.2	77
Turnips	1.4	0.2	7.4	38
Comfrey	1.0	0.5	14.8	69
Stachys	2.7	0.1	16.6	84

	Proteins.	Fats.	Carbo-hydrates.	Calories per 100 Gms.
Celery	1.5	0.4	8.15	58
Horseradish	2.7	0.3	15.9	52
Onions	1.6	0.1	10.4	51
Radishes	1.2	0.1	3.8	18
Asparagus	1.9	0.1	2.4	20
Green peas	6.6	0.5	12.4	86
String beans	5.4	0.3	7.3	59
Artichokes	2.5	0.1	8.3	46
Cauliflower	2.5	0.3	4.5	33
Red cabbage	1.8	0.2	5.9	34
White cabbage	1.8	0.2	5.0	31
Spinach	3.7	0.5	3.6	37
Lettuce	1.4	0.3	2.2	18
Endive	1.8	0.1	2.6	20
Savoy	3.3	0.7	6.0	47
Cucumber	1.1	0.1	2.2	14
Pumpkin	1.1	0.1	6.5	32
Melon	0.8	0.1	6.3	30
Watermelon	0.4	0.2	6.7	29
Eggplant	1.3	0.2	4.8	27
Tomatoes	0.9	0.2	4.0	22
Legumes.				
Peas	23.3	1.9	52.6	271
Beans	23.7	2.0	55.6	273
Lentils	25.9	2.0	52.8	272
Soya-beans	33.2	17.1	29.9	344
Legume flours.				
Beans	23.2	2.1	58.9	327
Peas	25.7	1.8	57.2	329
Lentils	25.7	1.9	56.8	328
Soya beans	25.7	18.8	38.1	407
Mushrooms.				
Mushroom (fresh, dry)	4.9	0.2	3.6	29
Egg-mushroom	41.7	1.7	30.5	249
Truffle (fresh)	9.1	0.5	6.7	49
Truffle (dry)	33.9	2.0	24.9	295
Edible boletus (fresh)	5.4	0.4	5.1	37
Edible boletus (dry)	36.7	2.7	34.5	249
Morel (fresh)	3.3	0.4	4.3	28
Morel (dry)	26.4	3.5	35.0	227

NUTS.

	Proteins.	Sugar.	Other Carbo-hydrates.	Calories per 100 Gms.
Chestnuts	2.9	1.2	37.0	175
Almonds	21.4	53.2	13.0	636
Hazelnuts	17.4	62.6	7.2	603
Brazil-nuts	15.5	67.6	3.8	708
Cocoanut	8.9	67.0	12.4	710
Pistachio nuts	22.3	54.0	13.8	574
English walnut	16.7	59.5	13.0	588
Olives, fresh	5.2	51.9	....	520

ARTIFICIAL FOODS (PROTEINS MADE FROM MEAT).

Tropon	90.54	0.16	....	371
Soson	92.8	0.2	....	376
Mosquera meat (Parke, Davis Co.)	77.0	13.0	....	437

Milk.

Eukasin	77.6	0.1	....	345
Galaktogen	75.7	1.1	8.9	...
Nutrose	82.2	0.4	....	352
Plasmon	71.6	1.8	....	334
Sanatogen	82.2	0.5	....	300
Albulaktin	81.8	0.3	....	338
Sanose	83.8	0.1	....	334
Bioson	69.2	7.2	7.1	385

Egg Albumen.

	Proteins.	Fats.	Carbo-hydrates.	Calories per 100 c.c.
Puro	35.6	....	....	146

Blood.

Fersan	84.0	0.3	....	364
Roborin	77.7	0.1	....	345
Prothaemin	90.2	0.2	....	370
Haematalb	77.4	....	....	...
Bovison	75.0	....	....	...
Sanol	80.0	....	....	...

Cereals.

	Proteins.	Fats.	Carbo-hydrates.	Calories per 100 c.c.
Aleuronat	79.8	2.9	8.6	390
Roborat	72.2	4.1	4.4	381
Energin	83.7	4.5	0.7	388
Glidin	86.0	1.4	1.8	335
Conglutin	10.76	....	66.5	...
Visvit	74.4	3.1	....	392
Materna	36.60	9.98	15.54	360
Yeast	54.0	3.0	28.0	364

Albumoses Peptones.

Witte Pepton	47.9	....	39.8	...
Somatose	76.6	....	2.8	340
Fortose	52.4	....	32.3	365
Riba	82.3	0.2	....	338
Pepton E. Carne	91.0	....	....	380
Erepton	78.4	1.2	3.4	...

FRUITS.

Kernel Fruits.	Proteins.	Sugar.	Other Carbo-hydrates.	Calories per 100 Gms.
Apple	0.40	8.85	3.3	51.7
Pear	0.36	8.61	3.4	49.1
Medlar	0.50	10.57	6.1	67.3
Quince	1.57	7.17	5.3	...
Orange	1.08	5.65	3.8	46.4
Lemon	0.74	0.37	4.13	41.4
Dates	1.7	0.2	48.6	285
Berry fruits.				
Grapes	0.69	14.96	1.9	72.0
Strawberries	0.59	6.24	2.8	41.9
Bilberries	0.78	5.29	0.71	31.7
Raspberries	1.36	4.29	0.99	31.3
Blackberries	1.31	5.72	1.1	34.3
Mulberries	0.36	9.19	2.3	53.7
Gooseberries	0.47	7.95	0.6	40.7
Currants	0.51	6.44	1.2	40.6
Cowberries	0.12	1.53	2.3	24.5

Stone Fruits.	Proteins.	Sugar.	Other Carbo-hydrates.	Calories per 100 Gms.
Prune	0.82	7.76	3.1	49.2
Plum	1.01	8.78	4.0	57.4
Reineclaude	0.55	10.53	2.1	54.9
Greengages	0.79	9.45	2.9	53.4
Peach	0.93	8.11	1.2	42.6
Apricot	0.86	6.66	1.3	38.6
Cherry	1.21	9.45	1.8	51.2
Various Fruits.				
Fig	1.35	15.50	....	66.5
Banana	1.40	16.20	5.4	71.2
Pineapple	0.42	15.50	....	47.1

MIXED ARTIFICIAL FOODS.

Theinbard's hygyama	21.9	9.0	60.1	420
Odda	14.5	6.0	71.5	408
Coffee, green	11.89	....	8.39	...
Coffee, roasted	13.77	....	1.23	...
Tea	26.3	9.0	....	...
Cocoa	28.17	14.0	18.16	482
Chocolate	6.3	22.0	53.7	470

Flours (Carbohydrates, Artificial Foods).

Oatmeal	11.1	5.1	73.6	395
Maizena	....	8.0	83.0	347
Arrowroot	0.9	....	82.4	342
Chestnut	2.8	3.4	75.8	354
Banana	3.5	0.9	80.0	351

Fats.

Cod liver	....	....	....	930
Sipanin	....	....	....	...
Scott's emulsion	....	....	....	410

WINES.

White Wines.	Alcohol.	Sugar.	Extract.	Calories per 100 c.c.
Moselle	7.36	0.20	2.3	60
Rhine	8.12	0.23	2.9	67
Red Wines.				
Baden	7.57	0.71	2.5	62
Bordeaux	8.16	0.23	2.4	66
Sweet Wines.				
Tokay (dry)	12.37	....	3.5	101
Vermouth	10.12	10.8	12.6	119
Marsala	11.59	3.25	6.0	106
Malaga	12.60	18.32	22.1	172
Sherry	16.09	2.40	4.1	129
Madeira	14.43	2.95	5.2	122
Port	16.18	6.04	8.2	146
Champagne (sweet)	9.50	10.95	12.9	116
Champagne (dry)	10.42	0.53	2.4	83
Champagne (fruits)	5.56	5.0	8.2	70
Fruit Wines.				
Apples and pears	4.74	0.58	2.9	43
Gooseberry (dry)	8.06	0.08	2.0	65
Gooseberry (sweet)	10.74	9.79	12.8	130
Bilberry (dry)	7.56	0.11	2.3	62
Bilberry (sweet)	7.86	7.96	9.2	91

BRANDIES.

Rum	53.0	....	....	388
Arak	51.0	....	....	369
Whiskey	49.0	....	....	356
Cognac	48.0	....	....	350
Cherry brandy	48.0	....	....	350
Prune brandy	42.0	....	....	297
Brandy	38.0	....	....	275
Vodka	33.0	....	....	240

LIQUEURS.

	Alcohol.	Sugar.	Extract.	Calories per 100 c.c.
Absinthe	48.0	4.10	....	346
Curacao	43.0	28.5	....	452
Boonekamp	42.0	....	....	312
Benedictine	38.0	32.6	....	461
Chartreuse	36.0	34.3	....	403
Anisette	30.0	34.4	....	390
Kümmel	24.0	31.2	....	328
Punch	19.0	33.2	....	300

BEERS.

Ale	5.27	5.99	0.61	60.5
Porter	5.16	7.97	0.63	67.4
Export beer	4.29	6.50	0.66	55.9
White beer	2.79	5.29	0.54	40.6
Pilsen	3.61	5.0	0.39	45.7
Kulmbacher	4.84	6.17	0.72	56.9

CHAPTER X.

MINERAL WATERS AND BATH RESORTS.

Mineral waters are waters which in solution hold more than a certain proportion of mineral salts and possess various medicinal properties according to the character of the salts contained therein.

CLASSIFICATION OF THE MINERAL WATERS.

A. Neutral Thermal. B. Acid. C. Saline. D. Alkaline. E. Bitter. F. Earth-alkaline. G. Chalybeate. H. Sulphur. I. Radio-active.

A. Neutral Thermal Waters.

Natural warm or hot springs, 68.6° to 149° F., with very little mineral content, which owe their therapeutic effect more to the softness of the water, its thermal stimulation, and the splendid climatic conditions and surroundings. *Indications:* As a tonic of the nervous system in recovering after serious operations, gout, neurasthenia.

Teplitz-Schönau, in Czecho-Slovakia: Hot, alkaline-salinic thermal springs, 82.4° to 114° F.; open during the whole year.

Johannisbad (Czecho-Slovakia), 84.2° F.

Warmbrunn (Silesia, Germany), 1100 feet above sea level.

Krapina-Toplitz (Jugoslavia).

Badgastein (Austria): Radio-active thermal springs, 81.5° to 119.7° F.

Tobelbad, near Graz (Austria): Strong, radio-active springs, 84.2° and 77° F., physic-dietotherapy.

Tueffer, 100.5° F.

Romerbad: Altitude, 780.5 feet, 100.5° F.

Ragaz (Switzerland), 85.6° F.

Toplitz, Sutinsko (Jugoslavia), 100.5° F.

Plombières (France): Altitude, 1275 feet. Temperature of the springs, 68° to 158° F.

B. Acid Springs.

Simple carbonated effervescent waters containing, besides alkali-carbonates and sodium chloride, a large amount of carbonic acid. They serve chiefly for dietetic purposes. They have sedative and slightly stimulating properties.

U. S. A.: Saratoga Springs; Lake County, Çalifornia; North Dakota (Acid Springs).

C. Saline Springs.

Saline springs, contain sodium chloride and carbonic acid; in some of them, iodine and bromine; in others, iron and calcium compounds. Their effect is mostly due to sodium chloride, increase of the metabolism, and improvement of the state of nutrition. *Indications:* Anemia, scrofulosis, gout, neuroses, stomach and intestinal catarrhs.

(*a*) Cool and tepid NaCl springs. U. S. A.: Livingston Artesian Well, Alabama: 295 grains NaCl pro gallon, 68° F. La Fayette Artesian Well, Indiana: NaCl 325 grains, $MgCO_3$ 325 grains, $MgCO_3$ and $MgCl_2$ 59 grains, $CaSO_4$ 56 grains; 55° F. High Gate Springs, Vermont: NaCl 23 grains, Na_2CO_3 14 grains. Kissingen (Bavaria): carbonated sodium chloride springs. Homburg (Nassau): with its nine springs containing from 3 to 26 per cent. sodium chloride, temperature of 48.2 to 51.8° F., for drinking and bathing: Hubertusbad in Germany.

(*b*) Hot NaCl springs. U. S. A. Silvam Springs, Colorado: NaCl 1137 grains, $CaSO_4$ 78 grains; 103° F. Des

Chutes Hot Springs, Oregon: NaCl and $MgCO_3$ 55 grains; 143° to 145° F.

Baden-Baden. Temperature of the springs, 107.4° to 156.2° F.; 2 per cent. NaCl, lithium chloride, arsenic.

Wiesbaden: Lithium and radio-active springs, and 6 per cent. NaCl.

Nauheim (Hessen): Carbonic acid springs used for baths. *Indicated* in diseases of the circulatory system.

Large amounts of chlorides. U. S. A. Mt. Clemens, Michigan (strong brine); Glen Spring, Saratoga Springs, New York; Caledonia Spring, Canada; Erchenbrecher's Salt Well, Ohio: 4300 grains NaCl, 53 grains $FeCl_3$, 28 grains NaBr. in a gallon; Great Salt Lake, Utah: 110° F., 22 per cent. solid content; Sheboygan Mineral Well, Wisconsin: 306 grains NaCl, 130 grains Ca, Mg. chlorides, sulphates and carbonates in a gallon. Useful in chronic constipation and baths (strong brines).

These are strong NaCl waters from 1.5 to 25 per cent. salt. Some of them, like Nauheim, Oynahausen (Germany), are thermal saline.

Among the cold saline springs, we cite the most important: Bad Ischl, 25 per cent NaCl, beautiful resort in Austria, former residence of the Emperor Franz Joseph. Climatic place. Baths and sanitariums.

Bad Aussee, 25 per cent. salt. Bath and drink cure. Climatic station. Inhalatorium. Reichenhall (Germany); Hall (Tyrol); Gmunden (Austria); Hall (Wuertemberg); Berchtesgaden (Bavaria); Rheinfelden (Switzerland); NaCl springs containing iodine and bromine.

Darkau, the strongest iodine-bromine spring in Europe.

Bad Hall (Austria): Altitude 376 meters. The waters contain 0.287 per cent. iodine and 0.0818 per cent. bromine magnesium (Tassilospring, called goiter water).

Lipik (Slavonia): Alkaline thermal, NaCl and iodine spring, 145.2° F.

NaCl springs containing iodine and bromine. U. S. A.: Bowden Lithia Springs (1200 feet), Georgia.

In one gallon:	15.23	grains	$Mg (Br.)_2$
	5.29	"	K Br.
	1.67	"	Lithium bicarbonate
	.73	"	Mg I
	20.21	"	$CaSO^2$
	124.49	"	$NaCl^4$

Tolz Krankenheil (Bavaria): I and S, Na_2CO_3 springs, baths and drink cures; inhalations; mud and salt baths.

Kreuznach (Germany): Radio-active salt springs, 1.3 per cent. NaCl; 0.004 per cent. iodine; 0.05 per cent. brom natrium, lithium. Drink and bath cures.

Ivonicz (Poland); Salzbrunn (Bavaria); Castrocaro (Italy); Saxons les Bains (Switzerland).

Indications: Arteriosclerosis, rheumatism, scrofulosis, lues, myoma, metritis, eczema, psoriasis.

Sea baths belong under this heading also, on account of the iodine and bromine compounds besides the salt. Hot sea and sea salt baths.

D. Alkaline Springs.

Hot and cold waters with alkali carbonates (lithium and Co_2). Some of them contain NaCl, hence alkaline-saline; others alkali sulphates, hence alkaline-sulphatic.

All these waters increase the secretion of the mucous membranes and have an anticatarrhal effect.

Indications: Chronic catarrh of all the mucous membranes, gout, rheumatism, renal calculi.

Bilin (C. S. R.): Temperature, 50° F., strong alkaline, 0.45 per cent. $NaCO_3$, 0.23 per cent. free CO_2, NaCl, KCl, Na_2SO_4, carbonates of Ca and Mg, lithium.

Giesshuebl (near Carlsbad), the purest alkaline spring.

Krondorfer; Sauerbrunn; Ober Salzbrunn (Germany): Cold alkaline carbonated water, with lithium, Na, Co_2, in diabetes, gout, catarrhs.

Vichy (France): Temperature, 53.6° to 109.4° F.

Neuenahr (Germany): The only thermal alkaline water (95° F.) in Germany.

Both Vichy and Neuenahr are specially indicated in diabetic cases with albuminuria in which sulphatic and salt waters are forbidden.

Neudorf (C. S. R.); Preblau (Austria), 828 meters; Radein (Austria), natrium, lithium-water, iron and CO_2 baths; Lipocz (Hungary), lithium and boric acid.

Offenbach (a/M.), lithium and boracic acid, cold springs; Assmannshausen, lithium; Fachingen, Teinach (Germany), Fellthalquellen; Buffalo lithia waters.

Alkaline-saline Springs.

U. S. A.: The Fountain Geyser, Yellowstone Park, Wyoming.

Gleichenberg (Austria): Temperature, 53.6° to 60.8° F., in catarrhs of the respiratory and digestive apparatus.

Ems (Germany): Na spring containing NaCl. Temperature, 82.4° to 134.6° F. Kudova, lithium. Luhatschowitz (C. S. R.), 254 meters, iodine and bromine.

Alkaline Sulphatic Springs.

U. S. A.: American Carlsbad Springs of Washington County; Genda Springs, Kansas; Black Bauen Mineral Springs (600 feet), southern part of Lancaster County, Penna. (mild, alkaline sulphated); Artesian Well, Louisville, Kentucky.

Carlsbad: Sixteen springs differing mostly in temperature, chemically very similar. Temperature from 68.0° to 145.2° F. Sprudel and Schlossbrunn, the hottest springs being

used in liver and gall-bladder diseases, gout, jaundice; Franz Josephs and Felsenquelle, in constipation; Bernardsbrunn in kidney and bladder diseases. Some of the colder springs are prescribed in hyperacidity, colica mucosa, skin diseases. Gargling with Schlossbrunn, mixed with hot milk, is given in catarrhs of the respiratory apparatus. Stomach and colon irrigations with Muhlbrunn or Sprudel are used in colica mucosa and chronic intestinal catarrhs. Mud compresses are for local applications in cases of cholelithiasis or any other chronic inflammatory conditions. All kinds of baths, Zander Institute.

Marienbad, 35 miles distant, situated higher than Carlsbad, has cold springs from 47.7° to 56.7° F. Kreuz and Ferdinandsbrunnen: Two alkaline, 2 iron springs; Rudolfsquelle: Earth alkaline. *Indications:* Plethora abdominalis, obesity.

Rohitch Sauerbrunn (Steiermark): Cold sodium sulphate waters with Fe, Mg, CO_2.

Balatonfuered (Hungary); Tarasp (Switzerland): 1200 meters. Na sulphate and iron springs. Bertrich (Germany): Warm sodium sulphate waters.

E. Bitter Waters.

Waters having a bitter taste, due to Epsom salt or Glaubersalt in solution, and having cathartic, laxative properties: Hunyadi Janos (Na_2SO_4), Epsom spring water ($MgSO_4$), Friedrichshall, Saidshitz, Pullna, Apenta, Rubinat, Carabana, and Friedrichschall.

F. Earth-alkaline Waters.

Containing carbonates and sulphates of Ca, CO_2, nitrogen. *Indications:* Chronic catarrhs of the urogenital apparatus.

U. S. A.: Bentley's Springs, Maryland, weak (600 feet); Chattobance Springs, Maryland, weak; Flint Stone Springs (925 feet), 12 miles from Cumberland, Md. Water contains 174 grains of solids in a gallon. Harris Lithia Springs, South Carolina. Useful in diabetes mellitus and uric acid stones (nephrolithiasis). Glenn Springs (1000 feet), S. C. Useful in diseases of the digestive tract and in functional disorders of the pelvic organs of women.

Borszek (Hungary); Wildungen, Lippspringe, Leuk (Switzerland); Contrexeville (France); Bath (England).

Baden near Vienna, Marienbad.

G. Chalybeate Waters (Iron Springs).

Waters containing iron in the form of sulphates, carbonates, and oxide, held in solution by the dissolved carbon dioxide, with some sodium, magnesium, and aluminum compounds. They have tonic virtues and are prescribed in debility and anemia.

Arsenic is present in some of the iron waters, as Roncegno, Levico, Metterbadm, Guberquellen.

Crockett Arsenic, Lithia Spring, Montgomery County, Virginia.

Morganton, Burge County, North Carolina (1184 feet).

Yellow Sulphur Springs (2000 feet). Rich in Ca, Mg., $Al_2(SO_4)_3$ and $Fe_2(CO_3)_3$. Water is valuable internally in treatment of amenorrhea, dysmenorrhea, and leucorrhea. Externally used for rheumatism and chronic skin disease.

Cold sulphur springs (2000 feet, Virginia), gaseous, sulphurous, chalybeate waters containing 253 cubic inches of H_2S in a gallon.

In Allegheny County, Virginia, are Sweet Chalybeate Springs (3000 feet) with earthy chalybeate waters. Used internally in the treatment of anemia, leucorrhea and neuralgia due to poverty of blood.

In Rockbridge County, Virginia, are Rockbridge Alum Springs, acid, chalybeate and aluminous. The waters are used internally for treatment of atonic and catarrhal affections of the mucous membranes, as chronic diarrhea, leucorrhea, pharyngitis, and rhinitis. They are widely sold throughout the United States.

Napa Soda Springs, California (1000 feet), 27 springs, 4000 gallons equals average daily flow. Waters are alkaline chalybeate and have an extended sale in California. Used in anemia, chlorosis and nephritis.

Highland Springs, California (1700 feet) for consumptives. Gaseous alkaline chalybeate, thermal or subthermal, artificially heated baths are employed in rheumatism and joint affections. Internally used for dyspepsia, neuralgia, kidney and bladder trouble.

Berkley Springs, West Virginia, H_2CO_3 and iron bicarbonate. (Cold springs).

Iron Ute Manitou Springs, Colorado.

Franzenbad has cold springs, rich with carbonic acid, Glaubersalt and iron carbonate. The mud baths and carbonic acid baths are quite famous.

Indications: Gynecologic cases, organic heart diseases, chlorosis, anemia. Season: May to September; from 8000 to 10,000 visitors. The mud of Franzenbad is used in the bath establishments of Carlsbad, also.

Pyrmont in Germany has Fe and NaCl springs. Elopatak (thermal).

Pyrawarth (near Vienna); Tazmannsdorf, Szliacs; Langenschwalbach, Karlsbrunn, Alexandersbad, Bartafuerdo, Bad Bartfeld (now in C. S. R.); St. Maurice (Switzerland); Cudova, Driburg (Germany); Spaa (Pyrenees); Cresson spring and Rockbridge water (U. S. A.); Bossing; Daruvar (Slavonia); Srebenica (S. H. S.); Königswarth (C. S. R.).

H. Sulphur Waters.

These contain in solution alkaline sulphides or polysulphides with hydrogen sulphide. They have alterative and slight laxative properties and are used mostly in form of baths in the treatment of skin diseases, gout, rheumatism. Internal use in plethora abdominalis, syphilis, bone diseases, paralysis, catarrhs.

U. S. A.: Montgomery White Sulphur Springs, Virginia (200 feet). Water is laxative, diuretic, and diaphoretic. Principal salts are Na_2, Ca_1, SO_4 and Mg, SO_4.

Clifton Springs (617 feet), New York. Waters contain sulphur and carbonic acid gas. Moderate quantities of Na_2 SO_4, $MgSO_4$, $CaSO_4$.

Richfield Springs, New York (1800 feet). Heavily charged with sulphurated hydrogen. Contains 112 grains of calcic sulphate in a gallon. Temperature of from 98° to 102° F. Waters are useful in insomnia from nervousness or from overwork, in stomach disorders, and especially in cases of rheumatism and gout. Massage, hot air treatment and static electricity are also available here.

Pluto Springs of French Lick Springs, Indiana, 279 miles from Chicago, discharges 80 gallons a minute. It is a muriated sulphur H_2O, carbonated. One gallon contains 66 grains, $MgSO_4$; 40 grains, $CaCO_3$; 52 grains, $MgCO_3$; 32 grains, $CaCl_2$; 141 grains, NaCl. This spring is used in treatments of chronic affections of liver and for dyspepsia. Water is concentrated and used in smaller quantities to be diluted for internal use. It acts as a hydragogue cathartic. It is useful in obesity.

Nenndorf, Weilbach and Greenbrier, West Virginia, have great reputation in cases of anemia connected with hemorrhoidal hemorrhages and sluggish circulation. Greenbrier White Sulphur Springs flow is 30 gallons a minute. Internally for affections of kidneys, liver and skin. Baths

(Turkish, Russian, Roman, Spout and Nauheim). Massage is also given. Waters seem to have beneficial effect in connection with advantages of climate in hay fever, chronic nasal catarrh, asthma and bronchitis, and when hot sulphur baths are used, rheumatism, gout and malaria are favorably influenced.

White Sulphur and Blue Lick Springs.

South America, Venezuela: Dr. Lozada's Trincheras Hot Sulphur Springs, near Valencia. Altitude 1500 feet. Thermal (90° to 98° Centigrade). Climate temperate (24° C.). The hottest springs in the world. Sulphureted, sodic and very strongly radioactive.

Aachen (Prussia): Temperature of the springs, 113° to 167° F.; Pyrenees, hot springs; Aix les Bains, Amelie les Bains, Barege (France). Cauterets, Luchon (S and Na); Baden (Switzerland, 110° F., rich in calcium.

Baden (near Vienna): Thirteen sulphur springs with a temperature between 73.4° and 96.8° F.

Bartfeld (C. S. R.): Deutsch Altenburg. Helouan (Egypt).

Herkulesfuerdo (Mehadia) (Roumania), S and NaCl baths, 98.6° to 140° F.

Harkany (Hungary); Leuk (Switzerland), cold springs. Neudorf (S and Ca).

Pistyen (C. S. R.), altitude 162 meters; thermal bath resort, near the little Carpathian Mountains. Radio-active thermal sulphur springs and sulphurated mineral mud, 140° F.

Trencsen-Teplitz (S. H. S.); Weilbach; Abano (Italy).

I. Radio-active Waters.

U. S. A.: Forty-four springs at Hot Springs, Arkansas, are radio-active to a marked degree due to dissolved radium

emanation (a gas) and not due to salts or other radio-active solids.

Radio-activity is lost soon after bottling.

Badgastein (Austria): Altitude, 3000 feet; temperature of the radio-active springs, 5° to 119° F.; inhalation of natural radium emanation.

Tobelbad (near Graz, Austria): 77° F. and 84.2° F.

Joachimsthal, near Carlsbad: The principal source of the Uranium pitchblende; altitude 2400 feet and temperature, 50° F. Highly radio-active and exceedingly copious springs.

The water from the radio-active springs which runs into the galleries of the pitchblende mines contains from 200 to 2140 Mache units per quart, and it is collected in reservoirs in the interior of the mines; then by a system of water conduits, into the bathing establishment, Upon entering the bath, the water has a strength of 600 Mache units per quart, an undoubtedly high degree of activity for natural radio-active water. A full bath of 200 quarts has consequently the respectable dose of 120,000 Mache units. In Joachimsthal, they have four different strengths, so arranged that 1, 2, 3 or 4 times 40 quarts of radio-active water are measured into the bath, warm and cold non-active water being then run in, until the bath contains the total quantity of 200 quarts of water at the temperature prescribed for each individual case—hence baths having an activity of from 24,000 to 120,000 Mache units. The radium baths can also be combined with electricity as hydro-electric baths. The same radio-active water is also used in the drink cure (one to two pints a day) (300 to 600 units). *Inhalation* cures with radium emanation are also given in the bath establishments.

Indications for treatments in Joachimsthal are: Chronic and subacute joint disease; neuritis; neuralgia, gout, chronic

myocarditis, arteriosclerosis; sexual neurasthenia; debilitas senilis; chronic skin diseases (psoriasis, eczema, lupus, etc.); chronic diseases of women; prostate hypertrophy; leukemia, enlargement of the lymphatic glands, carcinoma, sarcoma.

Among the other bath resorts with radio-active springs are: Baden-Baden, Kreuznach, Muenster am Stein in Germany; Postyen in C. S. R.

SEA BATHS AND SEA HEALTH RESORTS.

Sea baths add their good therapeutic effect to the climate conditions and the bathing. The air is more ventilated, more rich in ozone and humidity. The North Sea and Atlantic Ocean contain more NaCl than do the East Sea and the Mediterranean.

Sea baths (cold or heated), sun and sand baths, are indicated in neurasthenia, scrofulosis, tuberculosis, joint and bone diseases, anemia, chlorosis, agrypnia.

Atlantic City, New Jersey. Very good during winter and early spring. Good place to recover from fatigue attendant on city life in all phases, from insomnia, loss of appetite, and flesh. For coughs, sequelæ of grip and pneumonia. For effects of alcohol. Winter residence for aged. For subjects of chronic Bright's disease. For patients with early or quiescent pulmonary tuberculosis. For convalescents from acute disease.

Bar Harbor, Maine; Beach Haven, New Jersey; Block Island, Massachusetts. For very old and very young. For sufferers of functional nervous affections, neurasthenia, insomnia, and neuralgia, for convalescents from disease of respiratory organs, for chronic dysentery and diarrhea, and for enterocolitis of children.

Camden, Maine; Isle of Hope, Georgia; Newport, Oregon (crude accommodations); Virginia Beach, Virginia

(excellent surf bathing); Santa Barbara, California; Santa Cruz, California.

North Sea Bath Resorts: Ostende, Scheveningen, Blankenberge, Helgoland, Norderney.

Atlantic Ocean: Dieppe, Trouville, Biarritz, Havre de Grace.

East Sea: Heringsdorf, Ruegen (Copenhagen); Klampen.

Mediterranean Sea: Nizza, Ischia, Palermo, Venice, Lido, Trieste, Abazzia, Lussinpiccolo, Portorose, Grado, Cirvenica.

CLIMATIC BATH RESORTS.

Valleys and Heights to 1200 Feet.

California: Monrovia, 400 feet; Duerte, 500 feet; Agusa, 600 feet; San Gabriel, 100 feet; Chattanooga, Tenn., 762 feet; Stowe, Vermont, 700 feet; Morgantown, North Carolina, 1184 feet.

Austria: Salzburg, Baden (Vienna), Voslau, Gleichenberg, Tobelbad, Hallein, Gmunden, Ischl, Hallstadt.

Germany: Baden-Baden, Wiesbaden, Homburg, Soden.

Indications. Summer resorts, and corresponding to the qualities of their springs.

Valleys and Heights to 2700 Feet.

Altadena, California, 1500 feet; Triscan, Arizona, 2400 feet; Klamath Hot Springs, 2700 feet (Cal.); Clear Lake, California, 1700 feet; Cloudland, Tenn.; Lake Placid, New York, 1863 feet; Upper Saranac Lake, New York, 1573 feet; Clear Lake, New York, 2160 feet; Tannersville, Catskill Mountains, New York, 2000 feet; Bethlehem, New Hampshire, 1459 feet; Glenn Summit, Penn., 2000 feet. [For tuberculosis, chronic malaria, rheumatism and dyspepsia]. Glenn Alpine Springs, North Carolina, 1500 feet.

Austria: Gmunden, Aussee, Semmering.

Germany: Partenkirchen, Falkenstein, Badenweiler, Krenth, Garmisch.

Resorts at the Same Altitude under Alpine Influence.

Austria: Achensee, Kitzbuehl, Toblach, Tatrafuered.

Germany: Berchtesgaden, Tegernsee.

Switzerland: Lucerne, Meggen, Brunnen, Axenstein, Interlaken.

Indicated in tuberculosis, malaria, hyperthyroidism.

Altitude over 2700 Feet.

Strawberry Valley, California, 5200 feet; Yellowstone Park, Wyoming, 7000 to 8000 feet; Prescott, Arizona, 5456 feet; Fort Grant, Arizona, 4200 feet; Mountain Lake, Virginia, 4800 feet; Hot Springs, South Dakota, 3450 feet; Blowing Rock, North Carolina, 4025 feet.

Austria: Brennerbad, Innichen, Tatra Szeplak (C. S. R.).

Switzerland: Davos (1560 meters); St. Maurice; Rigi (Upper Engadin).

Indicated in tuberculosis, goiter, malaria.

Winter Resorts with Humid Climate.

Jacksonville, Florida; Tampa, Florida; Gulf Coast of Texas (Indianola, Galveston, Corpus Christie). West Indies, Nassau in Bahamas; Havana, Cuba; Honolulu; Coast of Southern California.

Switzerland: Montreux, Vevey, Lugano, Pallanza.

Italy: Abbazzia, Lussin, Ospedaletti, Bordighera, Nervi, Pisa, Gordone.

France: Pau, Nice, Mentone, Monte Carlo, Palermo, Cannes, Corsica, Ajacio, Corfu, Madeira.

Indicated in lung diseases, anemia, chlorosis.

Winter Resorts with Dry Climate.

San Diego, California (moderately dry); Aiken, North Carolina; Santa Barbara, California; Denver, Colorado; Colorado Springs, Colorado; Minnesota; Western Texas, El Paso; New Mexico, Arizona (Tucson, Phœnix, Yuma); Interior of Southern California.

Italy: Arco, Gries (near Bozen), Meran (altitude 340 meters). Malaga (Spain), Algier, Alexandria, Helouan, Cairo (dry).

Indications of Bath and Climatic Resorts for the Different Groups of Diseases.

Skin Diseases and Syphilis: S, I, Ra springs.

Nervous Diseases: CO_2, Fe, NaCl, Ra springs. East Sea, Mediterranean and altitudes up to 900 meters.

Diseases of the Respiratory Organs: NaCl, I, simple CO_2 waters. North Sea, Atlantic Ocean. Altitude over 900 meters. Egypt.

Diseases of the Circulatory System: CO_2 baths, Fe. Bitter waters, Na_2SO_4 East Sea, resorts to 600 meters.

Diseases of the Digestive Organs: NaCl, Na_2SO_4, alkaline-sulphatic springs, carbonated-alkaline waters, simple carbonated waters. Stomach and colon irrigations.

Diseases of the Urogenital Organs: Alkaline springs, earth-alkaline waters, mud compresses. Mediterranean resorts, winter resorts with dry climate.

Joint and Bone Diseases: Sulphur springs, iodine waters, radio-active springs, alkaline springs, NaCl springs, sea baths, sun and sand baths, mud baths, winter resorts with dry climate.

Women's Diseases: Iron springs, sulphur waters, radio-active springs, iodine waters, mud baths.

Metabolic Disturbances.

Diabetes: Carbonated alkaline waters, alkaline sulphatic springs, Epsom spring waters.

Gout: NaCl springs, alkaline springs, alkaline-sulphatic springs, sulphur waters, radio-active springs, and application of radium, mud compresses, and baths.

Chlorosis: Iron springs (arsenic), radio-active springs, sea baths; resorts over 900 meters, winter resorts with humid climate.

Anemia: NaCl springs, iron springs, radio-active waters, sea baths; climatic resorts over 400 meters altitude, winter resorts (humid and dry).

Obesity: Mud baths (Marienbad), alkaline-sulphatic springs, bitter waters, sulphur springs, North Sea, Atlantic Ocean.

Senile Asthenia: Simple carbonated waters, NaCl springs, iron springs, radio-active waters, sea baths, climatic resorts up to 700 meters altitude.

Hyperthyroidism: Co_2 baths, climatic resorts over 700 meters altitude, radio-active springs and waters, radium application. (St. Joachimsthal.)

Liver and Gall-bladder: Alkaline springs, alkaline sulphatic springs, mud compresses, bitter waters, sulphur waters, climatic resorts up to 600 meters altitude.

CHAPTER XI.

THE MOST IMPORTANT MINERAL SPRINGS AND BATH RESORTS IN U. S. A.

ALABAMA.

Bailey Springs: Alkaline chalybeate.

Bladon Springs: Alkaline carbonate.

Blount Springs: Saline sulphureted.

Livingston Artesian Well: Saline carbonated.

Matchless Mineral Wells: Acid chalybeate.

ARIZONA.

Mineral Park Bitter Springs: Magnesic-saline calcic water.

Gypsum Spring: Muriated and sulphurated saline calcic (both cathartic).

Hot Springs: Muriated saline.

ARKANSAS.

Arkansas Lithia Springs: Saline chalybeate, lithic.

Arkansas Hot Springs: Light alkaline calcic, thermal.

Ravenden Springs: Alkaline carbonated.

Sulphur Springs: Antacid and tonic properties.

CALIFORNIA.

Adams Springs: Alkaline carbonated.

Aetna Soda Springs: Alkaline saline, carbonated.

Aguas Calientes: Alkaline saline.

Aqua de Vida Springs: Alkaline carbonated.

Aqua de Vida (upper spring): Alkaline saline sulphurated.

Allen Spring: Alkaline saline carbonated.

Alum Rock Spring: Alkaline saline, carbonated.

Anderson Mineral Springs (Lake county): Cold sulphur springs, saline sulphocarbonated.

Sour Spring: Sulphated saline acid.

Arrow Head Hot Springs (San Bernardino County): Sulphated saline.

Azule Springs (Santa Clara County): Alkaline saline, carbonated.

Bartlett Springs (Lake County): Alkaline carbonated.

Blodgetts Springs: Alkaline carbonated, sulphurated.

Byron Springs:

(*a*) Liver and kidney spring, muriated saline.

(*b*) White sulphur spring, alkaline saline, chalybeate, sulphurated.

(*c*) Black sulphur spring, saline sulphated carbonated.

California Seltzer Spring (Mendocino County): Alkaline saline, calcic carbonated.

Calistoga Springs (Napa County): Saline sulphurated.

Calistoga Springs Swimming Pool: Saline sulphurated.

Castallian Mineral Springs: Alkaline saline.

Coronado Springs (San Diego County): Diuretic and tonic.

Duncan Springs (Mendocino County): Alkaline calcic.

El Paso de Robles (San Luis Obispo County): Main Sulphur springs, alkaline saline, sulphurated.

Eureka Springs (Humboldt County): Muriated saline sulphurated.

Fulton Wells (Los Angeles County): Alkaline saline, chalybeate, sulphurated.

The California Geysers (Sonoma County): Geyser Spa, alkaline, chalybeate, carbonate.

Gilroy Hot Springs (Santa Clara County): Alkaline saline, sulphocarbonated.

Glen Alpine Mineral Springs (Eldorado County): Alkaline saline, chalybeate, carbonated.

Gordon Springs (Lake County): Sulphated saline, alkaline carbonated.

Harbin Springs:

(*a*) Hot Sulphur Springs (Lake County): Saline, chalybeate, sulphur.

(*b*) Harbin Hot Springs: Chalybeate spring, sulphurated saline, chalybeate.

Highland Springs (Lake County):

(*a*) Seltzer Spring: Alkaline, chalybeate, carbon.

(*b*) Dutch or Ems Spring: Alkaline, chalybeate, carbonated.

Hot Borate Spring (Lake County): Alkaline saline, borated and ammoniated.

Lane Mineral Spring (Calaveras County): Acid chalybeate, sulphurated.

Litton Seltzer (Sonoma County): Alkaline saline, aluminous, chalybeate.

Mark West Springs (Sonoma County): Sulphurated. Temperature, 82° F.

Mono Lake Springs (Mono County): Muriated saline calcic.

Napa Soda Springs (Napa County); Pagoda Springs: Alkaline, chalybeate; Iron Springs.

Newsoms Arroyo Grande Springs (San Luis Obispo County): Alkaline, chalybeate.

Owens Lake (Inyo County): Alkaline saline.

Pacific Congress Spring (Santa Clara County): Saline, chalybeate.

Paraiso Hot Springs:

(*a*) Sulphur spring, saline, sulphur.

(*b*) The Great Paraiso Hot Soda Spring: Sulphated saline.

Piedmont White Sulphur Spring (Alameda County): Tonic, antacid, diuretic.

San Bernardino Hot Springs: Sulphated saline.

Santa Barbara Hot Springs: Alkaline saline, sulpho-carbonated.

Santa Rosa White Sulphur Springs (Sonoma County): Light saline, sulphurated.

Santa Ysabel: Sulphur springs.

Seigler's Springs: Alkaline and carbonated.

Skaggs Hot Springs: Carbonated borate.

St. Helena White Sulphur Springs (Napa County): saline sulphurated.

Summit Soda Springs: Alkaline saline, chalybeate.

Thermal Acid Springs (Inyo County): Heavy acid, chalybeate, saline, aluminous.

Tolenas Springs (Solano County): Alkaline saline, borated.

Ukiah Vichy Springs (Mendocino County): Alkaline saline, carbonated.

Volcanic Mineral Springs: Muriated and sulphated saline.

Witters Mineral Spring (Lake County): Saline, chalybeate, sulphurated.

COLORADO.

Glenwood Springs (Garfield County).

Yampa Springs: Muriated saline, sulphurated.

Hot Sulphur Springs: Saline sulphurated.

Idaho Hot Springs (Clear Creek County): Alkaline saline.

Manitou Soda Springs: In dyspepsia.

Morrison Springs: Laxative and alterative properties.

Pagosa Hot Springs: Alkaline saline.

Royal Gorge Hot Springs: Alkaline saline.

Royal Gorge Cold Soda and Iron Spring.

Springdale Seltzer Springs: Saline chalybeate, iodated and bromated.

CONNECTICUT.

Oxford Mineral Springs: Light saline, chalybeate.

South Farm Mangano-chalybeate Well: Light alkaline, chalybeate, manganese.

Stafford Spring: Light saline, chalybeate, carbonated.

Stark Mineral Springs: Neutral.

FLORIDA.

Suwanee Sulphur Springs: Alkaline calcic, sulphurated.

White Spring (Hamilton County): In rheumatism, dyspepsia, genitourinary.

Newport Sulphur Springs.

GEORGIA.

Atlanta Mineral Springs: Strong chalybeate.

Beall Spring: Sulphurated.

Bowden Lithia Springs: In genitourinary conditions.

Camp Springs: Chalybeate, sulphurated.

Cannon's Springs: Chalybeate.

Catoosa Springs: Alkaline saline.

Chalybeate Springs (Meriweather County).

Claremonde Chalybeate Springs (Washington County).

Powder Springs: Strong chalybeate.

Warm Springs: Light calcic carbonated.

Watson's Springs (Greene County): Sulphurated and chalybeate springs.

IDAHO.

Idan-Ha Springs: Alkaline saline, carbon.

Warm Springs: In rheumatism and skin diseases.

ILLINOIS.

American Carlsbad Springs: Sulphated saline.

Magnesia Spring Water: Alkaline saline.

Perry Springs: Chalybeate, alkaline, prescribed in stomach, liver and kidney conditions.

Zonian Springs: Light alkaline calcic.

INDIANA.

French Lick Springs (Orange County): Saline sulphurated.

Indian Springs: Alkaline saline, chalybeate.

Kickapoo Magnetic Springs: Light alkaline, calcic.

Lodi Artesian Well: Saline sulphurated.

Magnetic Mineral Springs: Saline, calcic.

West Baden Springs: Alkaline saline, chalybeate, calcic.

IOWA.

Fry's Mineral Springs: Alkaline saline.

Lineville Mineral Spring: Saline sulphurated.

Storm Lake Mineral Spring: Alkaline saline, chalybeate.

KANSAS.

Arrington Mineral Springs: Alkaline, chalybeate, carbonated.

Genda Springs: Sulphated saline, carbonated.

Manhattan Artesian Well: Sulphated saline, acid.

Topeka Mineral Wells: Alkaline saline.

Waconda Mineral Spring: Alkaline saline, carbonated.

KENTUCKY.

Clear Creek Spring: Light alkaline, calcic.

Crab Orchard Waters: Sulphated saline.

Estell Springs: Light sulphurated.

Grayson Springs: Light sulphurated.

Louisville Artesian Well: Sulphurated and muriated; saline sulphurated, carbonated.

Rock Castle Spring: Light saline, chalybeate.

MAINE.

Addison Mineral Springs: Light alkaline, chalybeate.
Blue Hill Mineral Springs: Light alkaline, chalybeate.
Highland Spring: Light alkaline, chalybeate.
Keystone Spring: Mild alkaline, chalybeate.
Paradise Spring: Neutral.
Poland Spring: Light alkaline, calcic.
Pownal Spring: Neutral.
Underwood Spring: Neutral.

MARYLAND.

Bentley Spring: Alkaline, calcic, saline.
Chattolanee Spring: Light alkaline, calcic.
Mardella Spring: Chalybeate.
Strontia Mineral Spring: Saline, calcic strontiated.

MASSACHUSETTS.

Ballardville Lithia Water: Lithiated chalybeate.

Commonwealth Mineral Water: Light alkaline, carbonated.

Massasoit Mineral Spring: Light saline, calcic.

Nobscott Mountain Spring: Light saline, calcic.

Sheep Rock Spring: neutral.

MICHIGAN.

Alpena Magnetic Springs: Saline sulphurated.

Americanus Mineral Well: Alkaline saline, chalybeate.

Butterworth's Mineral Spring: Saline, calcic.

Clark's Red Cross Mineral Well: Muriated.

Clark's Riverside Mineral Springs: Saline, muriated, sulphated, saline, calcic.

Eastman Springs: King David, calcic, chalybeate; Silver Queen, Silver King, Bimini, Golden Fountain: Alkaline, calcic.

Eaton Rapids Magnetic Springs and Wells: Alkaline, calcic, chalybeate.

Fruit Port Well: Saline, calcic, chalybeate.

Hubardstown Well (Ionia County): Alkaline, calcic, chalybeate.

Grand Haven Mineral Springs (Ottava County): Muriated saline, chalybeate.

Leslie Well (Ingham County): Calcic, chalybeate.

Moorman Mineral Well: Saline, calcic.

Mt. Clemens Mineral Springs (Macomb County): Saline.

Owosso Mineral Waters: Chalybeate.

Plymouth Rock Mineral Well (Wayne County): Alkaline saline.

Spring Lake Well: Muriated saline, calcic.

St. Clair Mineral Spring: Muriated saline, calcic.

Salutaris Spring: Alkaline saline, carbonated, an excellent table water.

St. Louis Spring: Alkaline, calcic, chalybeate, prescribed in dyspepsia, neuralgia, rheumatism, etc.

MINNESOTA.

Indian Medical Springs: Alkaline, calcic, chalybeate. Diuretic waters prescribed in dyspepsia, rheumatism, skin diseases.

White Mineral Springs: Alkaline, calcic. Temperature, 45° F.

MISSISSIPPI.

Brown's Wells: Sulphurated saline; acid chalybeate, prescribed in gastrointestinal, rheumatic and gouty disorders, anemia.

Castallian Springs (Holmes County): Saline, calcic. Temperature, 56° F.

Cooper's Well (Hinds County): Saline, chalybeate.

Godbold Mineral Well (Pike County): Chalybeate.

Ocean Springs (Jackson County): Saline, chalybeate.

Stafford Mineral Springs: Calcic, chalybeate.

MISSOURI.

Aurora Springs: Saline, chalybeate.

Blue Lick Springs: Muriated and sulphated, saline carbonated. The water is well adapted for the treatment of constipation.

Climax Springs: Jodobromated.

Excelsior Springs: Prescribed in genitourinary conditions.

Montesano Springs: Muriated saline, sodic, magnesic and calcic.

Sweet Springs: Muriated, saline, calcic.

MONTANA.

Boulder Hot Springs (Jefferson County): Saline, chalybeate, sulphur. Temperature, 125° to 187° F.

Ferris Hot Springs (Gallatin County): Saline, silicious.

NEBRASKA.

Magnesia Spring, Victoria Mineral Spring: Alkaline saline, calcic. Temperature, 55° F.

NEVADA.

Walley's Hot Spring (Douglas County): Sulphated saline, 130° to 169° F., prescribed in renal skin conditions and rheumatism,

NEW HAMPSHIRE.

Birchdale Spring (Merrimac County).

The Concord Spring: Calcic, chalybeate.

Bradford Mineral Spring: Sulphur, chalybeate.

Londonberry Lithia Water: Alkaline, chalybeate. Lithiated and aluminous. Acts as an antacid, diuretic and ferruginous.

NEW JERSEY.

Pine Lawn Spring (Bergen County): Light alkaline, calcic.

Schooley's Mountain Spring (Morris County): Chalybeate spring.

Heath House Spring: Saline, chalybeate.

NEW MEXICO.

Hudson Hot Spring (Grant County): Alkaline, calcic.

Las Vegas Hot Springs (San Miguel County): Saline.

Ojo Caliente (Hot Springs) (Taos County): Thermal, alkaline, chalybeate.

NEW YORK.

Adirondack Mineral Springs (Washington County): Saline, chalybeate, prescribed in anemia, general debility, subacute and chronic articular and muscular rheumatism.

Avon Sulphur Springs (Livingston County): Saline, calcic, sulphurated.

Albany Artesian Well: Saline, calcic.

Ayer's Mineral Springs (Erie County): Calcic, chalybeate.

Ballston Spa (Saratoga County): Saline.

Cherry Valley Springs: Sulphurated.

Chittenango Sulphur Springs (Madison County): Calcic, sulphurated, prescribed in rheumatism, neuralgia, gout and skin diseases.

Clifton Springs (Ontario County): Sulphur spring.

Colonial Spring: Light alkaline, chalybeate. Diuretic and tonic.

Columbia Spring: Saline, sulphurated.

Deep Rock Spring (Oswego County): Saline.

Doxtatter's Mineral Well (Monroe County): Saline, sulphurated, calcic.

Dryden Spring (Tompkins County): Sulphurated, chalybeate.

Esperanza Mineral Spring (Yates County): Calcic, sulphurated.

Geneva Lithia Spring (Ontario County): Lithiated, saline, chalybeate.

Glen Springs (Schuyler County): Calcic. Vulcan Spring: Saline, chalybeate. Salubria Spring: Muriated saline. Neptune Spring: Saline, calcic, jodobromated. Deer Lick Spring: Saline, chalybeate.

Great Bear Spring: Light alkaline, calcic.

Lebanon Spring (Columbia County): Thermal, alkaline, calcic.

Massena Spring (St. Lawrence County): Saline, sulphurated.

Oak Orchard, Acid Spring (Genesee County): Sulphated acid.

Richfield Spring (Otsego County): White sulphur springs, alkaline, calcic, sulphated.

Saratoga Springs (Saratoga County): Alkaline saline, carbonated.

(*a*) Champion Spouting Spring: Columbian, Crystal, Congress, Empire, Eureka, Excelsior, Flat Rock, Geyser Spouting Spring, Hamilton, Hathorn, High Rock, Kissingen, Pavilion, Putnam, Red, Saratoga Alum, Seltzer, Star, Union, United States, Vichy, Washington Springs.

Sharon Springs: Saline, calcic, sulphurated.

Slaterville Magnetic Spring (Tompkins County): Prescribed in debility, anemia, bladder troubles.

NORTH CAROLINA.

All Healing Springs: Alkaline, calcic, chalybeate.

Barium Spring.

Blackwell (Buncombe County): White sulphur spring.

Bromine Arsenic Springs (Ashe County): Alkaline.

North Carolina Hot Springs: Alkaline saline, calcic.

Mt. Vernon Spring (Chattam County): Calcic, chalybeate.

Park's Spring: Sulphurated, saline, chalybeate.

Panacea Spring (Halifax County): Alkaline saline, chalybeate.

Shaw's Healing Spring (Warren County).

Shocco Spring: Sulphated saline.

OHIO.

Cedar Springs: Light alkaline, chalybeate.

Cincinnati Artesian Well: Muriated, saline, sulphurated.

Crum Mineral Spring: Alkaline, calcic.

Erkenbrecker's Salt Well: Muriated, chalybeate.

Fountain Park Spring: Muriated, saline, alkaline.

Stryker Mineral Spring: Sulphated and muriated, calcic, chalybeate.

Sulphosaline Spring: Muriated, saline, alkaline.

Yellow Spring (Greene County): Alkaline, calcic.

OREGON.

Belknap Hot Medical Spring (Lane County): Muriated, saline, calcic.

Boswell Spring: Carbonated, sulphurated.

Des Chutes Hot Springs: Alkaline saline, carbonated.

Lake View Hot Springs: Iodated, sulphurated, sodic, magnesic.

Wilhort's Soda Spring (Clackamas County): Alkaline saline, chalybeate, laxative and diuretic.

PENNSYLVANIA.

Bedford Springs (Bedford County).

Magnesia Spring: Sulphated, saline, calcic.

Bowling Alley Spring: Sulphated, saline, alkaline, calcic. Laxative and diuretic.

Bedford Chalybeate Spring: Calcic, chalybeate.

Black Barren Mineral Spring (Lancaster County): Mild alkaline, saline.

Cloverdale Lithia Spring: Alkaline saline, chalybeate.

Cresson Springs:

(*a*) Magnesia Spring: Mild alkaline.

(*b*) Pure Spring: Indifferent.

Frankfort Mineral Spring: Alkaline, chalybeate.

Gaylord and Gulick Mineral Springs: Sulphated, acid, chalybeate.

Gettysburg Springs (Adams County): Alkaline, calcic.

Glen Summit Spring: Neutral. Pure valuable water for domestic use.

Minnequa Spring (Bradford County): Light alkaline, carbonated.

Parker Mineral Spring: Muriated, saline, calcic.

Pavilion Spring (Berks County): Neutral.

Ponce de Leon Spring (Crawford County): Alkaline, carbonated.

Rosscommon Spring: Neutral, lightly carbonated.

Saegerstown Mineral Spring: Saline, calcic.

Three Springs (Huntingdon County): Spring No. 1, sulphurated, saline, calcic.

White Sulphur Spring (Bedford County): Sulphated, saline, alkaline, calcic.

RHODE ISLAND.

Darling's Mineral Spring (Providence County).

Gladstone Spring (Washington County).

Holly Spring (Providence County): Neutral, for domestic purposes.

Ochee Springs (Providence County): Light alkaline, calcic.

SOUTH CAROLINA.

Ambler Spring (Pickens County). Ambler Mineral Spring: Light alkaline, calcic.

Charleston Artesian Wells. Old Artesian Well: Alkaline, muriated, saline. Temperature, 87° F.

Chick's Springs (Greenville County): Calcic, chalybeate.

Glenn Springs: Alkaline, calcic.

Harris Lithia Spring: Alkaline, calcic.

West Springs (Union County): Alkaline saline, calcic.

SOUTH DAKOTA.

South Dakota Hot Springs (Fall River County):

(*a*) Minnekahta Springs: Saline, calcic, thermal.

(*b*) Mammoth Mineral Spring: Sulphated, saline, calcic.

(*c*) Lakatah Spring: Sulphated, saline, calcic.

TENNESSEE.

Austin's Springs (Washington County): Sulphated, saline, chalybeate. Cathartic.

Avoca Spring (Sullivan County): Chalybeate.

Crocker Spring (Davidson County): Sulphated, saline, calcic.

Dixie Springs (Knox County). Dixie Mineral Water: Alkaline saline.

Fernvale Springs: Alkaline saline, sulphurated.

Galbraith Springs: Light calcic, chalybeate.

Glenn Spring: Alkaline, carbonated, antacid and mild diuretic.

Montvale Spring: Sulphated, saline, chalybeate. Ferruginous tonic.

Red Boiling Spring; Little Red Spring: Alkaline, saline, sulphurated. Red Spring No. 2: Saline, calcic, sulphurated. Diuretic.

Tate Spring: Saline, calcic, chalybeate. Purgative water with tonic properties.

Upper Red Boiling Spring: Muriated, calcic, sulphurated.

TEXAS.

Gibson Wells (Palo Pinto County): Alkaline saline. Cathartic.

Overall Mineral Wells (Robertson County): Sulphated saline. Aluminous and chalybeate.

Texas Sour Springs (Caldwell County): Sulphated saline, acid chalybeate.

Wootan Wells (Roberston County), Well No. 1: Sulphated saline, chalybeate. Well No. 4: Same properties as No. 1.

UTAH.

Beck's Hot Sulphur Springs (Salt Lake County): Muriated and sulphate saline.

Midway Warm Springs: Alkaline saline, calcic.

Utah Hot Springs: Muriated, saline, carbonated.

Warm Spring (Salt Lake County): Muriated, saline.

Wasatka Mineral Spring: Muriated, saline, calcic. Diuretic.

VERMONT.

Alburgh Spring: Saline, sulphurated.

Clarendon Spring: Light saline, carbonated.

Elgin Spring (Addison County): Alkaline saline.

Equinox Spring (Bemington County): Light alkaline, calcic.

Middletown Spring: Alkaline, chalybeate.

Montebello Springs (Orange County): Alkaline, calcic. Diuretic and antacid.

Sheldon Spring (Franklin County): Alkaline saline, silicious.

Vermont Mineral Springs (Windham County): Light saline, chalybeate.

VIRGINIA.

Alleghany Springs (Montgomery County): Sulphated, magnesic, saline. Diuretic and cathartic.

Harry's Antidyspeptic and Tonic Springs: Light sulphated saline.

Bath Alum Spring: Acid chalybeate. Aluminous.

Bedford Alum Springs: Acid chalybeate. Aluminous.

Blue Ridge Springs: Sulphate, saline, carbonated.

Buffalo Lithia Springs: Lithic aluminous calcic. Antacid, diuretic.

Cold Sulphur Springs (Rockbridge County): sulphated, sulphureted and chalybeate.

Colemanville Mineral Springs (Cumberland County), Spring No. 7: Mild alkaline saline. Spring No. 19: Mild alkaline, chalybeate.

Crockett Arsenic Lithia Springs: Light sulphated saline. Arsenical and lithiated. The waters act as a nerve sedative and a tonic.

Daggers Springs: Sulphur springs.

Farmville Lithia Springs (Prince Edward County): Alkaline carbonated.

Fauquier White Sulphur Springs: Alkaline chalybeate.

Glenola Springs: Light iodic alkaline, carbonated.

Holston Springs (Scott County): Sulphated saline, calcic.

Hot Springs (Bath County), Boiler (Bath) Spring: Alkaline saline, calcic, thermal. Temperature, 108° F. Soda (Drinking) Spring: Alkaline, calcic, sulphated saline. Temperature, 74° F. Spout Bath Spring: Alkaline, calcic, thermal. Temperature, 106° F. Old Spring and New Spring: Sulphated saline, calcic. Diuretic, laxative and tonic properties.

Hunters Pulaski Alum Spring: Aluminous, chalybeate.

Iron Lithia Spring: Sulphated saline. Aluminous and chalybeate.

Jordan White Sulphur Springs (Frederick County): Alkaline, sulphurated.

Massanetta Spring (Rockingham County): Alkaline, chalybeate.

Millboro Spring (Bath County): Sulphurated, alkaiine.

Nye Lithia Spring: Alkaline, lithic, chalybeate, alkaline chalybeate. Lithic calcic.

Rawley Spring (Rockingham County): Light carbonated, chalybeate.

Roanoke Red Sulphur Springs: Alkaline, carbonated, sulphureted.

Rockbridge Alum Springs: Acid, chalybeate. Aluminous. Temperature, 50° to 56° F.

Rock Enon Springs (Frederick County): Chalybeate spring. Aperient and diuretic.

Sweet Chalybeate Spring (Red Spring): Calcic, chalybeate. Temperature, 75° F.

Washington Spring: Sulphur Spring: Magnesia Soda Iron Spring: Alkaline, calcic, chalybeate. Prescribed in anemia, general debility.

Yellow Sulphur Spring (Montgomery County): Sulphate, saline, calcic.

WASHINGTON.

Medical Lake: Alkaline saline, sodic.

WEST VIRGINIA.

Addison Sulphur Springs: Muriated saline calcic. Temperature, 57° F.

Berkeley Spring (Morgan County): Light calcic, chalybeate.

Borland Mineral Well: Alkaline, muriated, saline, sulphurated.

Capon Springs (Hampshire County): Light alkaline, calcic.

Greenbrier White Sulphur Springs: Saline, calcic, sulphureted.

Irondale Springs: Aluminous, manganese, calcic.

Old Sweet Spring: Alkaline saline, calcic.

Red Sulphur Spring (Monroe County): Light saline, sulphureted.

Rose Hill (Hart Well) (Pleasants County): Alkaline saline.

Salt Sulphur Spring (Monroe County): Saline, sulphur, calcic.

WISCONSIN.

Allonez Mineral Water: Alkaline saline, calcic. Antacid, laxative.

Arctic Spring: Alkaline, calcic. Temperature, 48° F.

Fort Crawford Mineral Water: Alkaline, muriated and sulphated saline.

Hackett Springs: Light alkaline, calcic.

Palmira Mineral Springs: Mild diuretic and antacid.

Salvator Mineral Spring (Brown County): Alkaline, calcic, chalybeate.

Sheboygan Mineral Well: Muriated saline, sodic and magnesic.

Sparta Mineral Wells (Monroe County): Chalybeate.

Waukesha Mineral Spring: Alkaline saline, calcic.

WYOMING.

Rawlin's Sulphur Springs (Carbon County): Saline, calcic, sulphocarbonated.

Yellowstone National Park, Fountain Geyser: Alkaline, muriated saline. Antacid, diuretic and aperient. About 2000 springs, highly mineralized and thermal (Springs, Geysers and Streams). Temperature from 42° to 159° F.

INDEX